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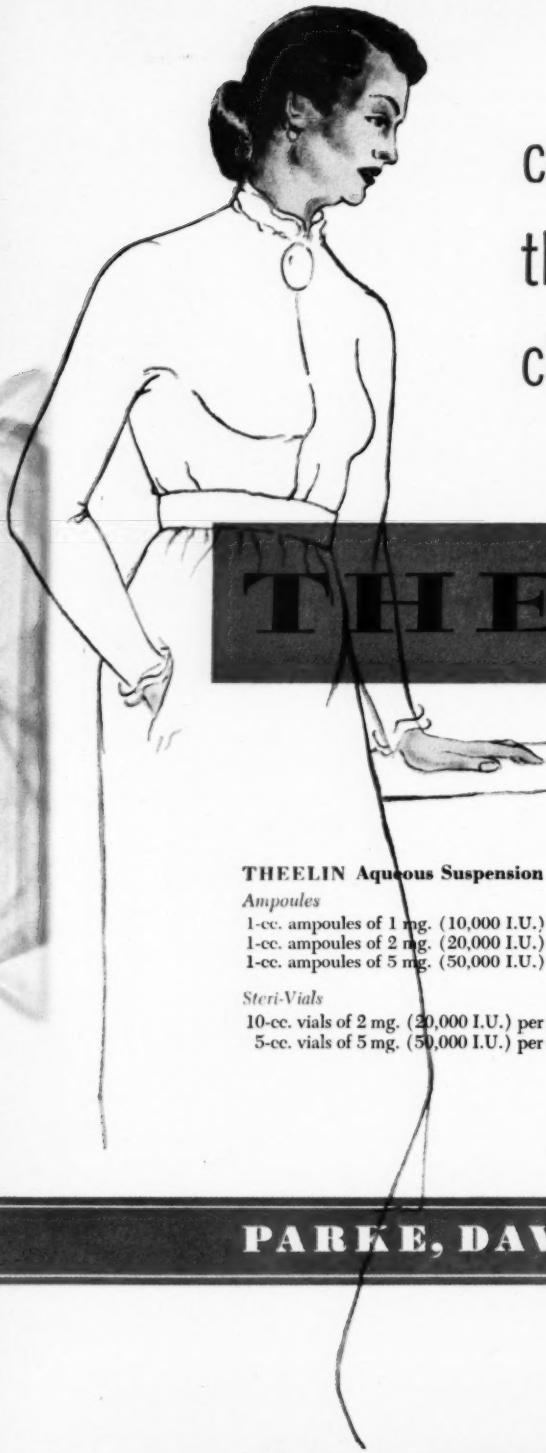
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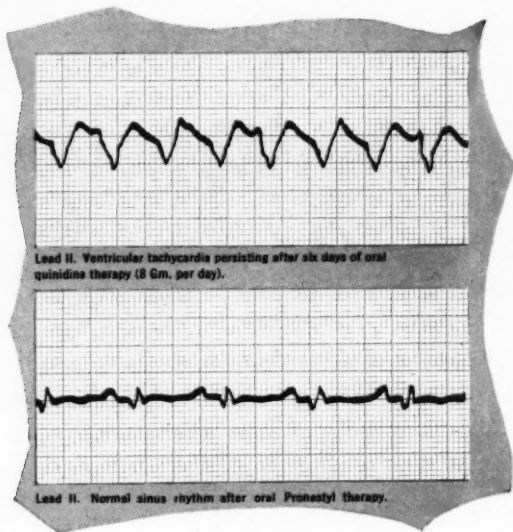


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I. Perloff, W. M.: Am. J. Obst.  
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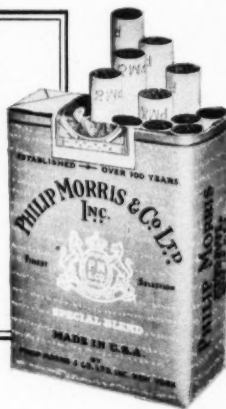
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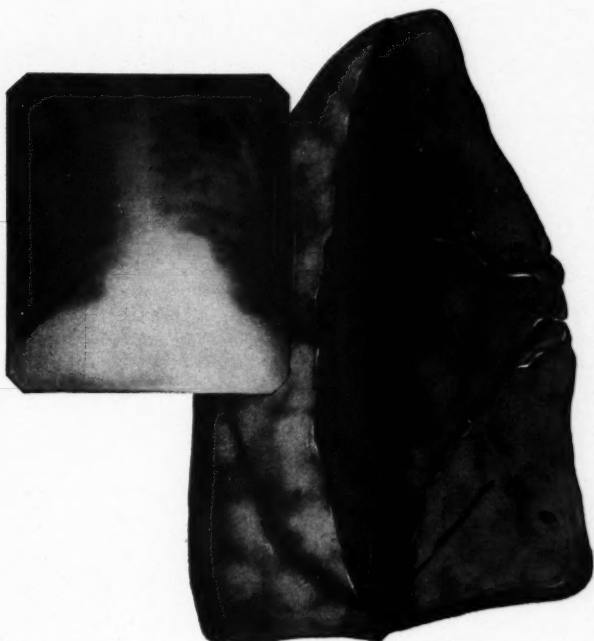
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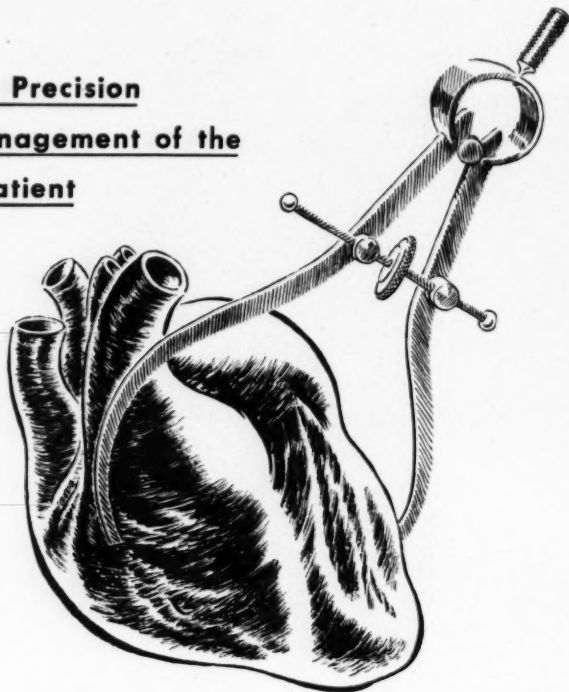
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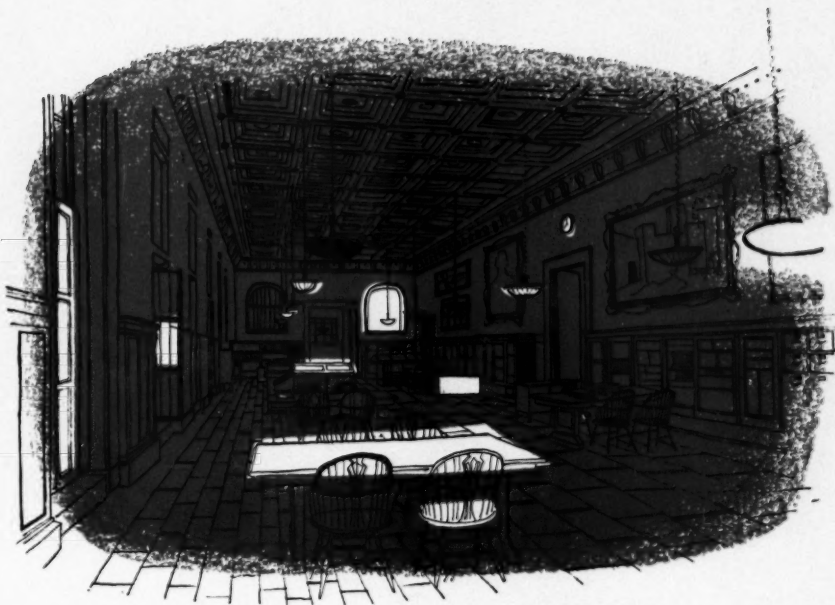
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## Meat... Its Place in the Dietary Management of Nephritis

The formerly held tenet that protein intake should be restricted for all patients with impaired renal function, in order to afford the kidney physiologic "rest," is no longer valid.<sup>1</sup> Except for infection and some neoplastic and traumatic disorders, the treatment of renal disease is nonspecific and essentially symptomatic. The clinical problem centers largely on diet regulation, in the hope of stimulating the kidneys to improve impaired function, without unduly risking harm.

Even in the presence of azotemia, a protein intake of 60 to 80 Gm. per day has not been found harmful to the renal patient. Low protein intake, on the other hand, together with urinary loss of protein may encourage the development of asthenia, anemia, hypoproteinemia, and edema.<sup>2</sup> Also pertinent to the dietary management in renal disease is the experimental finding that high protein diets in normal dogs promote higher urea clearance and greater renal blood flow than do low protein diets.<sup>3,4</sup>

Except in anuria, a protein intake adequate to maintain nitrogen balance has been suggested.<sup>1</sup> Although as little as 30 to 40 Gm. of protein per day may suffice for this purpose in the fever-free patient at bed rest, few occasions arise when 1 Gm. of protein per day per kilogram of body weight may not be given safely. In the presence of significant proteinuria, unless specifically contraindicated, the dietary protein may be increased beyond that amount in order to counterbalance the urinary protein loss.

Contrary to the still prevalent ancient belief among the laity, red meats are just as harmless to the renal patient as white meats; nor is there evidence that plant proteins are more beneficial in nephritis than animal proteins. As with the normal person, the dietary protein of the patient should be of high biologic value.

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1. Mann, G. V., and Stare, F. J.: Nutritional Needs in Illness and Disease, Handbook of Nutrition, American Medical Association, ed. 2, Philadelphia, The Blakiston Company, 1951, chap. 17, p. 351.

2. Weiss, S.: Diet and Bright's Disease, Connecticut M. J. 5:496, 1941.

3. Jolliffe, N., and Smith, H. W.: The Excretion of Urine in the Dog: II. The Urea and Creatinine Clearance on Cracker Meal Diet, Am. J. Physiol. 99:101, 1931.

4. Van Slyke, D. D.; Rhoads, C. P.; Hiller, A., and Alving, A.: The Relationship of the Urea Clearance to the Renal Blood Flow, Am. J. Physiol. 110:387, 1934.

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<sup>1</sup> Moss, Henry N. and D. G. Scudiero, *Depts. of Pathology and Medicine of the University of Chicago*. "Depo-Heparin: evidence coagulation time in man." *The Practitioner*, *Dec. of Treatment* 7, 1964, 1965.  
<sup>2</sup> *Practitioner*, *Dec. of Treatment* 7, 1964, 1965.

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1. Perloff, Wm. H. (1951), Treatment of the Menopause. II. American J. Obst. & Gynec., 61:670, March.

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Hamblen, E. C.: Some Aspects  
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in General Practice,  
North Carolina M. J.  
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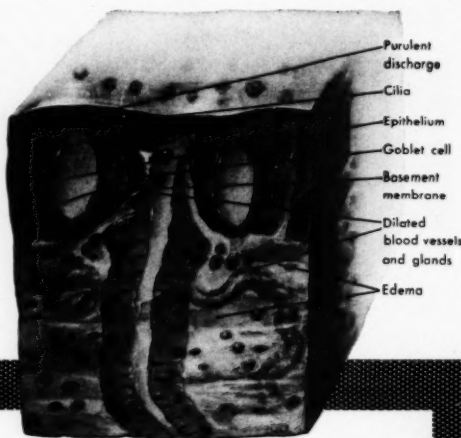
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1. Rehfuss, M. E., Albrecht, F. K., and Price, A. H.: A Course in Practical Therapeutics. Baltimore, Williams & Wilkins Co., 1948, p. 111.

2. Kelley, S. F.: In Cornell Conferences on Therapy. New York, Macmillan Co., 1947, Vol. 2, p. 156.

3. Gold, H.: In Cornell Conferences on Therapy. New York, Macmillan Co., 1947, Vol. 2, p. 151.

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## OTOLOGIC APPLICATIONS OF AUDIOLOGY

E. R. MAYERBERG, M. D.\*  
Wilmington, Del.

Otology is a branch of medicine which deals with disorders of the ear. The major portion of the problems confronting the otologists is confined within the temporal bone. Audiology is a new specialty and is a highly derivative field of knowledge. It represents a synthesis of many other fields — physics, psychology, linguistics, acoustics and pedagogy, to mention a few—undertaken for a special purpose: to study and treat the class of problems that relates directly to the function of hearing. The term audiologist is restricted to those persons who have had extensive training, specialization and experience in dealing with hearing and hearing loss in individuals. Since the otologist also deals with hearing and hearing loss, both special fields have a common basic problem. Working together and pooling their respective views, these two specialties should increase the rate of advancement in problems of hearing and hearing impairment. For some reason there has been a delay in the proper coordination of these two special fields.

One reason may be that audiology originated in the college and not the medical schools. When audiology was still in its embryonic stage, the most fruitful source of audiologists was the college speech clinic, now renamed the speech and hearing clinic. Patients were rehabilitated in these clinics, but the basic philosophy remained that of training and not treating.

Little attention was given to the pathology present, perhaps because that information was not readily available. Diagnostic comparisons between hearing loss and diseased states often were not accomplished. Audiologists emerging from such a background can see little need for close association with otology and do not have

the opportunity of observing the audiologists and otologists working together.

The audiologist, however, is not entirely to blame for this improper recognition. The medical profession must accept the major portion of the blame for the delay in proper coordination of these two fields. Except for a few farsighted men such as Fowler, Goldstein and more recently Lederer, Canfield, Crows, and others, otologists as a whole failed to realize the diagnostic and therapeutic potentials of this hybrid specialty, audiology. Hearing loss was a medical or surgical problem. When routine treatment failed nothing more could be done. The number of teeth, tonsils and nasal septums removed for the treatment of otosclerosis is an excellent example of the medical approach to hearing loss. There are some otologists who consider the audiologist a technician whose job it is to carry out audiometric testing or consider audiology as a dumping ground for undesirable hard-of-hearing patients. Unfortunately, there are still physicians practicing otology who have no knowledge of audiology.

Audiology is now at a stage of development where it functions best in close cooperation with the medical profession and this cooperation is what we are striving to achieve at Delaware Hospital. It is not sufficient to have peripheral relationship between audiology and the medical profession. Merely occasional contact between the two will not serve the hard-of-hearing patient as he needs to be served. The audiologist must be a full member of the team along with the roentgenologist, the neurologist, the rhinologist and the other specialists called upon to aid in the diagnosis of otologic problems. He should be a colleague on the diagnostic and therapeutic team and not a manipulator of admittedly complex equipment. Fortunately, steps are being taken to educate both members of this potential team, although it is a slow process. The lead-

\*Director, Department of Otolaryngology, Delaware Hospital. Presented at Staff Meeting, November 13, 1951.

ing audiologic training centers are providing increasing contacts for their students with the otologists. Courses of instruction in the anatomy, physiology of the ear, nose and throat are required of audiology students in many training centers and are provided in many medical schools and universities specifically for audiology students.

Conversely, the graduate training centers for otologists are including many phases of audiology in their curriculum and some centers require extensive practical experience in the audiology center as part of graduate training. Practicing otologists are given opportunity to visit and participate in seminars in audiologic clinics.

Newer and better audiology centers are being established in medical schools throughout the country. In many, such as Johns Hopkins, Pittsburgh, Illinois, to mention a few, the audiologic staff has faculty rank in the School of Medicine and gives lectures to graduate and undergraduate medical students. Heretofore, because of the poor geographic grouping of medical schools and universities, audiologic coverage has not been adequate. Establishment of an audiology center in a general hospital is a comparatively new departure but a good one. It brings necessary services to the hard-of-hearing who do not have access to large medical centers and provides the audiologist easy access to the services of other medical specialties.

Audiology now fills an important gap in the handling of the hard-of-hearing patient. We now have much-needed help not only in diagnosis but also in carrying our patients through the complete range of therapy. The concepts of healing the aurally handicapped individual has been broadened beyond medical and surgical bounds. Through close association between otology and audiology, our otologist is not limited in his therapy, our audiologist finds his true role in medicine, and, above all, our hard-of-hearing patient receives the maximum benefit which can be achieved.

There are very few centers of this type in general hospitals and they are widely scattered. We are very fortunate to have this hearing and speech center at the Delaware Hospital and it is due to the farsightedness and progressiveness of our Board of Trustees

and our live, wide awake Director of the Hospital, Mr. R. R. Griffith. They have long felt the need of it and they went to a great deal of expense in its development.

We have one of the most remarkable sound-proof rooms in the country. It is a floating room, in other words, a room within a room and is about as sound-proof as it is humanly possible to make it. The Board of Trustees has spared no expense to furnish the necessary equipment. The State Board of Health has been most cooperative in the establishment and the support of the clinic.

The Board of Trustees succeeded in obtaining the services of an outstanding audiologist, Mr. L. LeRoy Horne, to head the center. We have been functioning now about nine months and each month shows a steady progress under his guidance.

Several months ago we sent out otological examination forms to the otologists and some of the internists and general practitioners, as well as the pediatricians. These forms look lengthy, but they really are not, but are the type you can answer with "yes" or "no" sign. If for any reason you find them cumbersome, you may ignore them and send the patient to the center anyhow and all of that part will be done there. We would like very much for each case referred to the center to be seen by an otologist, but that is not absolutely necessary.

#### **THE CONSERVATION OF HEARING\* A Joint Project of the Otologist and the Audiologist**

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Conservation of hearing programs are receiving increased attention throughout the country. In previous years these were centered in large teaching institutions. Since World War II when the armed services developed such centers for the rehabilitation of service incurred deafness, the desire to help the deafened has spread to the smaller communities. It has been a natural tendency not only to rehabilitate the deaf, but to prevent deafness wherever possible. This obviously must be undertaken early in childhood. Such a desire is

\*Department of Otolaryngology, Delaware Hospital, Presented at Staff Meeting, November 13, 1951.

now expressed in the Audiology Center at the Delaware Hospital.

Conservation of hearing is a complex project and actually should not be the sole desire of the otologist or the audiologist. To be a successful undertaking it must have the wholehearted support of not only the entire medical profession but the community at large, as well. By receiving such support there would no longer be the attitude of pessimism which in former years so often met the hard of hearing.

The first requisite in a program of this sort is the detection of the potentially deaf. It is obvious that the otologist or audiologist cannot do this without help. The testing of hearing of school children in Delaware has been the main source from which cases have been found. However, it is imperative that all of the medical profession must be aware of methods by which they can help. In order to better understand the problem, the causes of deafness should be outlined.

The types of deafness can be classified under two headings, namely: congenital, and acquired.

Congenital deafness includes otosclerosis and predisposition to eighth nerve degeneration, as well as anatomical malformations. Otic malformations may vary from a slight defect to complete absence of the external as well as the internal ear. Prenatal toxic causes also leave their mark in embryonal development: for example, virus diseases such as German measles in the first trimester of pregnancy. Statistics show that 33 to 50 per cent of such cases result in a congenital deafness. To a lesser extent, prenatal development of mumps and influenza result in similar defects.

There are four broad groups of causes of acquired deafness, namely:

1. Diseases of the central nervous system — meningitis, encephalitis, brain tumors, circulatory diseases, concussion of the central auditory area, and fracture of the temporal bone.

2. General infectious diseases — scarlet fever, measles, mumps, pertussis, etc., which cause nerve degeneration by high fever. Fig. 1 illustrates the effect of high fever in infancy. This child had a temperature of 104° for al-

most a week when she was eighteen months old. She is now ten years of age.

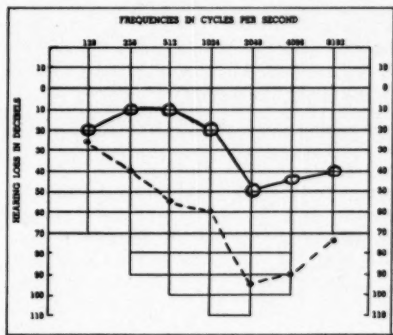


FIG. 1  
B. J. H. Age 10 years.

3. Infections of the ear — otitis media, mastoiditis, and external otitis. Fig. 2 illustrates the effect of a mastoiditis on hearing. This patient is now twenty years of age. At five years of age she had a mastoidectomy.

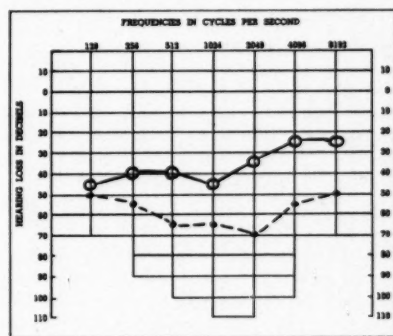


FIG. 2  
E. S. Age 20 years.

4. Physical agents — impacted cerumen, foreign body impaction, accidental trauma to the ear, and acoustic trauma due to sudden excessive noise (explosions, gun fire, etc.).

In reviewing the above causes, it can be seen that many of the causes receive the attention of others of the profession besides the otologist. In such a way, and with emphasis on possible impairment of hearing, can all of us help in this undertaking.



What can be done in a concrete way to prevent deafness?

The prevention of congenital deafness is not an easy problem to solve. If hereditary deafness exists in both parents, the children of this marriage will almost certainly be deaf. If one parent has hereditary deafness and the other has a history of such in the family, authorities state that it is probable that the offspring will be deaf. If one family is free of such a history, the prospect of normal children is good. It can be seen, then, that the prevention of this type of deafness is a eugenic problem. Since the deaf are most likely to associate with others so afflicted, intermarriage cannot be prevented. However, the possibility of their having deaf children should be explained to them.

As far as German measles in the first trimester, it has been recommended that all young girls be exposed in childhood. It is only by previous exposure that such deafness can be prevented. The practicability of such exposure is open to question.

Control of prenatal syphilis and premarital blood tests has certainly decreased the possibility of a luetic cause.

All of the above cause a nerve deafness before acquisition of speech. The importance of preventing these can be readily seen, since it is extremely difficult to learn speech without hearing. It is true that it can be done, but not without laborious, time-consuming instruction. Seldom is speech learned under these conditions without a severe defect or even unintelligible speech. There is nothing so segregating as this handicap. It is further recommended that hearing tests be done on children who have been classed as feeble minded. Some of these have been found to have normal intelligence, but a severe deafness.

The prevention of acquired hearing losses is a twofold problem: (1) education of the community as to detection of hearing loss in a child, and general health measures; and (2) adequate treatment of medical disease.

Approximately 80 per cent of preventable acquired hearing losses are due to Eustachian tube occlusion. Relatively, general infections of the nose and throat in the adult cause only minor difficulties with hearing. However, in the child similar infections all too often result

in severe hearing impairment. The Eustachian tube of the child is short and patulous. It is also on a more horizontal plane than in the adult. This allows comparatively free access between the throat and the middle ear. This means, therefore, that any pathology with primary or secondary effects in the nose or throat is a potential cause of deafness in children. Figs. 3a and 3b illustrate a case of eustachian closure before and after a tonsillectomy.

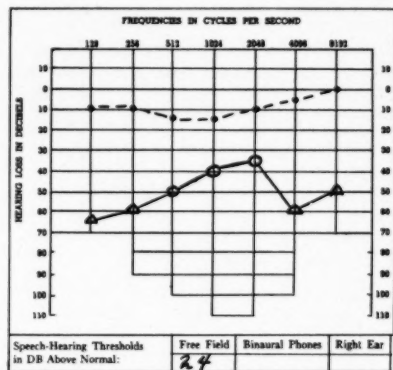


FIG. 3A

F. T. Age 14. Before T & A—Feb. 14, 1951.

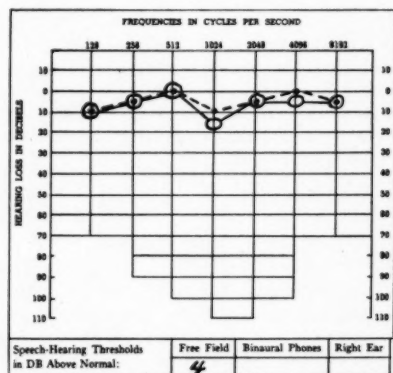


FIG. 3B

F. T. Re-test Aug. 8, 1951 after T & A—May 10, 1951.

It follows, then, that if the primary causes, such as a general infectious disease, for example measles, cannot be prevented, the second-

any complications should be. Immunizations in childhood have certainly helped in a large degree to prevent deafness due to the disease itself. With the wide selection of effective antibiotics today, serious ear infections are fast becoming a rarity. However, a great deal more emphasis should be placed on possible hearing loss which may follow. This is often not noticeable and may be blamed on inattention in the child. It would be wiser to test these children's hearing following such disease.

Sometimes it is necessary to use radium therapy to the adenoid area about the eustachian tube orifices following surgery. This consists of three treatments at two-week intervals. It is an effective agent in competent hands, and has no danger whatsoever to the patient. This method has been used for many years at Johns Hopkins Hospital, where it was first instituted.

So far, at the Delaware Hospital Hearing Center, the bulk of cases of children have come from the State Board of Health. The detection of cases was by school screening tests or referred to the Board of Health by physicians.

An otological examination is done at their first visit. Any treatments needed are begun, and if any surgery is needed this, too, is recommended. A hearing test is recorded also on their first visit, and this is used to check on their future course and needs. Three months after removal of tonsils and adenoids, a second audiogram is done. Many who had hearing impairments before operation have been found to be normal. These cases, however, will be followed at six-month intervals for reexamination. Those needing speech and hearing instruction are enrolled in suitable classes.

In summation, then, the following points have been reviewed:

1. A conservation of hearing necessitates the full cooperation of not only otologists, but all physicians.

2. A pessimistic attitude to the severely deafened is a defeatist outlook. Many with nerve impairment can still be helped at the center with a hearing aid, and most important, instruction in using residual hearing.

3. It is hoped that all otologists will work in full cooperation with the audiologist. There

is a part for both, each being important in his own sphere.

4. The detection of the hard of hearing, whether the moderate or severe degree, is the keystone of the whole effort.

#### PROCEDURES FOR THE TREATMENT OF COMMUNICATIVE DISORDERS RESULTING FROM IMPAIRMENT OF HEARING\*

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Albertus Magnus, teacher of St. Thomas Aquinas, and the dominant figure in Latin learning and natural science of the thirteenth century wrote "Lion's brain, if eaten, causes madness, but remedies deafness, if inserted in the ear with some strong oil." Another scholar, Hildegard of Bingen (about 1125), held that "deafness may be remedied by cutting off a lion's right ear and holding it over the patient's ear just long enough to say, 'Hear, Adimaeus, by the living God and the keen virtue of a lion's hearing'" and that "the heart of a weasel dried and placed with wax in the ear, benefits headaches and deafness."<sup>1</sup>

Over the centuries, little has been done for the individual with a permanent hearing impairment. However, in recent years, a new field has developed. Audiology, meaning the science of hearing, seems to be a useful name for this field, even though linguistic purists may object to adding a Greek suffix to a Latin root. Audiologic services were made available here at Delaware Hospital with the opening of the Audiology and Speech Center in February of this year.

The procedure of diagnosing and retraining the handicapped persons' communicative habits and related attitudes are the work of clinical audiology. There is a three fold objective in this audiologic task: (1) to determine which individuals have communicative disorders as a result of permanent handicapping hearing impairments; (2) to furnish the individual with the communicative tools with which to offset his impairment to an optimum degree; (3) to help him gain insight into his disability and the problem it raises.

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Complete diagnostic evaluation is a joint project for the otologist and the audiologist. It includes an otologic examination, a full series of hearing tests, psycho-acoustic and psycho-social examination, and a thorough case history.

Too much emphasis can not be placed upon the need for an accurate, efficient battery of routine physiologic-acoustic tests. More often than not, the otologist and the rehabilitative specialist are concerned to make related but somewhat different interpretations. Each must interpret for his own purposes, not content with a mere description of the disability, yet know what the other is doing and why he is doing it. Too often, tests of auditory acuity, of monaural relations, of peripheral-central comparisons, of threshold-suprathreshold contrasts of speech-hearing function in quiet and in ambient noise, are treated merely as physiologic descriptions without special interpretation for the task at hand. The otologist must assume responsibility for the optimum function of the hearing mechanism and for the physical welfare of the case; the rehabilitative specialist must assume responsibility for the communicative retraining of the person. Both must concern themselves with the psycho-social readjustment of the individual.<sup>2</sup>

At a minimum, our diagnostic tests include the following: (1) puretone audiometry, with properly calibrated equipment and with due recourse to masking when binaural disparity or inconsistency indicate its use; (2) speech audiometry, the determination of the intelligibility threshold for standard speech signals; (3) speech and voice tests, including tests for discrimination loss. Other related tests and retests may be called for by the routine findings. These may include: (1) psychometric examination; (2) loudness-balance tests; (3) monaural-binaural tests of acuity for various types of signals; (4) the Lombard test (particularly useful to recheck unilateral hearing loss when there is a possibility of functional disparity); (5) the Doerfler-Stewart test, or some variation, for malingering and psychogenic deafness. Still other possibilities will be suggested by the nature of the findings and by the details of the case history. Moreover, it often proves true that the task of fitting a

hearing aid throws additional diagnostic light on the particular case.

Our Audiology and Speech Center is adequately equipped with office space, clinical acoustic rooms, teaching areas and work bench area for minor electronic and hearing aid repairs and endaural insert impressions.

In the clinical acoustic rooms, where hearing tests are administered, isolation from extraneous sounds has been carefully planned, for the effect of masking on hearing is well known. Fluctuations in the noise level of a testing room has been isolated and ambient noise level is maintained below 24 db. In the audiometric testing rooms, sound level is maintained at about 35 db.

In order to properly conduct the tests previously mentioned extensive electro-acoustic equipment has been assembled. There are three modern audiometers, properly calibrated and maintained. A complex electronic hearing evaluator for the sound-free room and control-room area. This versatile assembly is capable of accepting several different input signals separately or at the same time. These signals are transmitted through one amplifier. There is also provided a high-fidelity loud-speaker assembly, two headphones, capable of being controlled separately as well as one unit. For communication with the tester, a one-way microphone, amplifier-headphone, talk-back system is provided. This equipment makes possible the determination of speech-hearing thresholds and the administration of an infinite variety of speech and pure tone tests.

Galvanic skin response equipment has recently been installed. With this equipment has been developed a technique whereby threshold audiometric measurements may be obtained with infants, very young children, and with psychogenics. The method employs the "ascending technique" in audiometry, together with the Feré effect and a modified form of Pavlovian conditioning. Mild faradic shock is used for conditioning. The idea is that, with the use of pure tone as a warning signal a few seconds before a shock is given, a child can be conditioned so that significant skin-resistance changes are developed following the tone in anticipation of the shock. What happens in this use of the Feré effect is that stimulation of the sympathetic nervous system (internally

by 'thinking' or 'reacting emotionally'; externally by the application of a pinprick, a mild shock, a sound, and the like) increases the activity of the sweat glands: increase saline in the skin under the electrodes causes a lowering of the resistance and therefore a change in the currents in the bridge. The changes in the bridge-currents are amplified and recorded in wave form, and can be interpreted as positive or negative responses to the stimuli.

With the assumption of reasonably normal sympathetic responses from the child, skin-resistance audiometry is the only method recently known that promises to meet all the criteria applicable to clinical diagnostic testing of the acuity of the auditory end-organ in infants and very young children.

Thus on every patient, a complete battery of tests can be administered in order to properly evaluate the hearing disability in terms of actual extent of the organic loss.

Now, before any audiologic recommendations can be made, if it has not already been accomplished, the patient is referred to the otologist for consultation because it must be determined what the etiologic factors are: whether the hearing loss is permanent; whether the hearing can be improved medically; what the hearing prognosis is; whether there is active pathology, etc. In short, the optimum functioning of the hearing mechanism must be insured.

Then, through interview and counseling, a determination is made as to the extent of the communicative disorder caused by the loss of hearing acuity and a psycho-social evaluation is made.

Based on otologic findings, medical history, diagnostic hearing tests, psycho-acoustic and psycho-social examination, a diagnostic hearing evaluation is made. Interpretation of audiologic findings and recommendations for retraining are made with the clinic purpose clearly in mind. The audiologist must make the best possible use of whatever facts and meanings can be brought to light, but his interpretations and recommendations are made primarily in terms of the communicative needs of the individual and the readjustment of his behavior.

Every person with a hearing impairment is

entitled to a complete diagnostic evaluation. A program of auditory rehabilitation can be devised for every type and degree of hearing loss and for all ages. Our patients here already have ranged from the "deaf" 2 year old to the 84 year old gentleman who has been hard of hearing for years.

In the case of an adult whose hearing loss post-dates the acquisition of language, we have one type of problem. If a hearing aid is indicated, a scientific objective hearing aid selection is made, based on the performance of the patient on the various hearing aids tried. The patient is then given intensive auditory training to teach him to use his residual hearing to best advantage and to become a "successful hearing aid wearer". Speech-reading, speech therapy, speech conservation, language training, mental hygiene and vocational counseling also are available. Even within this category the program must be flexible, for problems differ with type of loss, with the degree of loss, the personality factors involved and a multitude of other factors too numerous to mention.

If the hearing impairment pre-dates the acquisition of language, which is so often the case in the youngsters seen at the center, the problem is quite different. In some instances language development is severely retarded and often completely absent. Hearing is evaluated primarily through galvanic skin response audiometry. Parents and home environment must be evaluated to determine feasibility of training the child at home. If this is feasible, we think in terms of hearing aid possibilities, sense training, auditory training, language and speech development, parent education and counseling, etc. If evaluated early enough, and given proper training, many hard of hearing children can remain at home and eventually enter normal grade school. Recommendation for resident schools for the deaf must be made in some instances.

Because diagnostic interpretation and retraining procedures must be carried out to suit the requirements of the "whole person," it is difficult to generalize the clinical methodology. Hearing aid recommendations, speech reading, auditory training, speech therapy, etc. are not separate entities but are considered with all other aspects which can contrib-

ute to the rehabilitative task and are or are not recommended and provided after complete diagnostic evaluation.

We are pleased to be a part of a general hospital where services of all medical specialties are available. It is obvious that otology is indispensable to audiology; ideally every pre-school age audiologic patient should have a complete pediatric work-up; so very often we feel that psychological or neurological consultation is indicated before hearing can be properly evaluated or a program of re-education can be properly provided. And so it goes down the line of specialties.

Conversely, our services are here for you to utilize. How many recommendations have been made for institutionalization of the apparently feeble-minded, without ruling out the possibility of deafness rather than mental retardation? If you, a pediatrician have a retarded infant or youngster as a patient would you like help in ruling out deafness as a contributing factor? How many cases of cerebral palsy are there whose hearing should be investigated? It has been found that there is usually some 8th nerve involvement in almost all cp's. If you, an obstetrician, have a hard of hearing patient with otosclerosis, would you like to know how much the progression is hastened by each pregnancy? Many psychological problems in both adults and children have been found to have unsuspected deafness as a primary cause. Or, as a psychiatrist with a suspected conversion hysteria or psychogenic overlay, would you care to know the actual extent of organic hearing impairment? Or for you, as a neurologist, can we discover evidence of 8th nerve involvement?

Audiologically, therefore, we have a dual purpose:

(1) to function as a hearing diagnostic center;

(2) to function as a hearing rehabilitation center, with the ultimate aim of teaching the hard of hearing individual to compensate for his communicative difficulties in such a way that he can live a reasonably normal existence in a hearing world.

Let me cite examples to illustrate how our services function.

The three cases that I have chosen as illustrations are rather typical of the type of case

that we are apt to receive in the audiology center. The first case is that of a child, A. B. (Fig. 1), male, born on February 27, 1947.

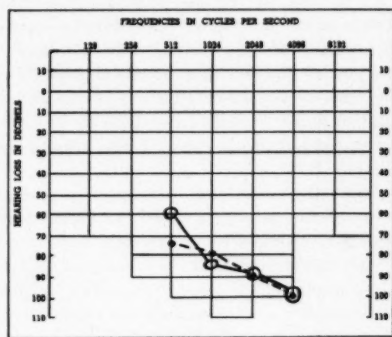


FIG. 1

A. B. Age 3 years. Galvanic Skin-response. Audiogram—May 30, 1950.

He has two older sisters, one eight and one six. They have no difficulty with their hearing. The father has been hard of hearing all his life and his deafness has been diagnosed as a nerve type but the cause has not been ascertained. There has been some deafness in distant branches of the paternal grandmother's family. Two great aunts are supposed to have been born deaf. The child was out of a normal pregnancy, and was full term. The mother had no rubella, no bleeding, no unexplained fever during pregnancy. The mother's Rh is negative and the father has a questionably negative Rh. The child was not jaundiced at birth and he had no transfusions. He has had a bilateral ptosis of both eye lids and has had eccentric pear-shaped pupils. The parents think that the lid lag is a result of an infection of tear ducts developed when the child was an infant but this is not quite clear. He has had no serious illness, no loss of consciousness and no convulsions. He has had no difficulty with his ears and no otitis media. He had mumps at the age of one; measles at the age of two, when he ran a fever of about 105 degrees. During the winter of 1949 he had two virus infections. Development: the child did not walk until he was two and a half years of age. He fed himself at 14 months. He was toilet trained at 3 years. When first seen at the age of three his speech development was

severely retarded and speech was practically non-existent. He uttered a few guttural sounds mostly of a vowel quality with no discernable consonants. His hearing loss was suspected between the age of one and two, as he has always responded poorly to sounds. He did not even notice hands when they were clapped behind him. He listened to the radio and kept time with it but it had to be turned very high. He did not play too well with children, was rather possessive and fairly aggressive. He was subject to rather marked temper tantrums. There has been no special attempt made at any education.

When first examined in 1950, otological examination showed the following: Glands—not enlarged. Ears—drums were quite retracted and very slightly injected. Nose and Mouth—the membranes were good color, the breathing space was sufficient. There was no discharge seen in either nostril. There was a very large mass of adenoid tissue in the nasopharynx. The eustachian orifices were covered with adenoids. The tonsils were moderately enlarged and somewhat injected. The pharynx was slightly injected, there was some post-nasal discharge visible and some hypertrophied lymphoid tissue on the posterior wall. Sinuses were not examined. Diagnosis made at the time was: Hearing impairment, bilateral, severe nerve type, probably on a congenital basis. Tonsils and adenoids were subsequently removed surgically in the fall of 1950 with good surgical results. T & A produce some slight improvement in hearing but not sufficient to be of a clinical significance.

In the fall of 1950 a long range program of hearing rehabilitation was planned for this family. The youngster was introduced to amplification using a portable table-type binaural headset amplifier and a program of sense training, language development and speech habilitation was instituted. He was given intensive work in auditory training and a program was developed for his family to follow. This program included speech development, lip reading instruction and development of awareness of communication. In April 1951 he was fitted with a wearable hearing aid and a custom-made endaural insert. He has now progressed to the point where he wears the hearing aid during his entire waking day. He

is seen in our center for two therapy sessions a week and since the acquisition of the wearable hearing aid he has made remarkable progress. He is fortunate to have been blessed with intelligent, steady parents who are well aware of the problem and are constantly working with him and stimulating him with speech and language situations. He is now talking in whole sentences and communicates very well. He plays well with children and there has been no evidence of temper tantrums for months. He has developed but few of the usual hard of hearing mannerisms, none of the usual voice and speech patterns so commonly heard among the deaf.

The majority of the therapy in cases of this kind must be conducted by the parents under the guidance of a trained audiologist. Progress in this case is very satisfactory and we are sure that if it continues he shall be able to enter normal grade school and compete successfully with normal hearing children and that there shall be no reason for confining him to a resident school for the deaf at any time. Ptosis of the left eye lid was corrected surgically at Delaware Hospital on May 15, 1951 and the right eye lid on June 5, 1951 with good surgical results. With the application of what we believe to be good rehabilitative procedures this child is developing language and speech normally with good inflection in his voice, good intonation patterns and good voice quality. All this work has been done at home and here at the Center with the result that he has been able to maintain residence with his parents which is most advantageous for children of his age. There has been no use of manual sign language whatsoever and no institutionalization has been required.

The next example is that of a young lady, Miss C. D., 17 years of age. The history in this instance is incomplete, due to the involved family background. The father and mother were separated and the father has shown very little interest in the child. The mother is presently a patient at the Delaware State Hospital at Farnhurst. Deafness is reported to have been congenital of a severe nerve type. Fig. 2 shows the audiogram taken in our clinic on September 14, 1951. For six years prior to coming to our clinic she had been a resident student at a state school for the deaf. Otolof-

ical examination showed no active pathology but no detailed report was furnished as to the appearance of the ear, nose and throat. Patient reported that during her six years at

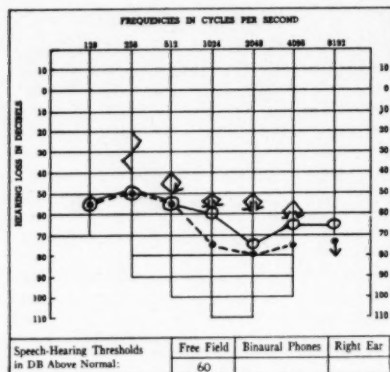


FIG. 2

C. D. Age 17 years. Subjective audiogram—Sept. 14, 1951.

the school she had had very little work with amplification, she had worn a hearing aid for a period of two weeks but it had been abandoned, and she indicated that she made very little use of her vocal mechanism but did most of her communication through the manual sign language. When first seen her speech was barely intelligible; she had severe articulatory disorders and limited use of language. Her voice was lacking in inflection and had an extreme breathy quality. She seemed to tire very easily when she used it. Although she was a fairly proficient lip-reader, and signified understanding she made little effort at oral communication but resorted to gestures. She gained nothing from radio, television or the movies and avoided social contacts except with deaf youngsters at the school who used the manual sign language. Deaf school reported ninth grade attainment in written subject matter. Psychometric testing revealed above average intelligence.

A hearing aid selection was accomplished and a hearing aid recommendations were made. This particular case is a ward of the State Department of Vocational Education and the latter agency purchased her a hearing prosthesis. She made an excellent adjustment to amplification and even though without am-

plification she required an intensity of 60 db. to hear speech stimuli, with amplification she could comprehend easily at 18 db., or well within normal hearing range. She has been given an intensive and extensive program of training, in audition, speech correction and communication and has progressed well. Her voice quality has changed to a remarkable degree and she communicates very well. Through speech therapy she has been taught how to use her voice with less strain and now talks for long periods of time without tiring. She has tremendous imitative ability and has been able to improve her speech at a remarkable pace. Upon our recommendation, she did not return to the state school for the deaf from which she had come but arrangements were made for her to reside with an aunt, locally, while she attended classes here at the Center. After a considerable period of hearing rehabilitation, arrangements were made for her to attend a local business school where she is now enrolled five days a week, with a full program of business arithmetic, typing, filing, etc. She enjoys the work at the school very much, is making good progress, and in order to facilitate her learning she is being given individual instruction. As an additional part of her rehabilitative procedures, she has been aided in securing a position with a local department store, working on Saturdays in order to have more contact with hearing and talking people. This young woman is a good example of good rehabilitation material and has made a good adjustment and before long will be able to take her place as a self supporting and well adjusted member of a hearing population.

I would like to give you some background on one of our favorite patients. Mr. E. F. is 84 years young. He reported that he had been hard of hearing for approximately 20 years. He added that it had been becoming progressively worse in recent years. He complained of inability to hear his radio and television programs; constant necessity to ask for repeats in conversation both in social and business situations, resulting in repeated frustration. Otological examination revealed external ear normal, canal normal, tympani membrana normal. Nose multiple small polyps and pansinusitis, transillumination being all dark.



Nasopharynx was negative and oropharynx negative. Diagnosis was pansinusitis, (2) allergic rhinitis and (3) arteriosclerosis. Although this has not been confirmed with his physician, the patient reported that he was a diabetic and had an eye condition giving him sight in only eye.

He was given a battery of objective hearing tests on October 2, 1951 which revealed that he had a moderately severe nerve deafness, and Fig. 3 shows his hearing picture. Hearing aid

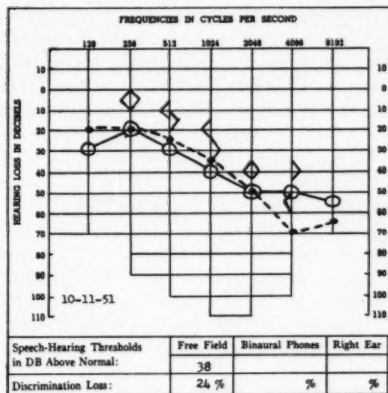


FIG. 3

E. F. Age 84 years. Subjective Audiogram—Oct. 11, 1951.

recommendations are always made with extreme caution when there are gerontal involvements. However, this individual was obviously mentally active and alert. He is very much the active extrovert, is fond of people and is disturbed by his communicative disorder. He himself took the step to secure help with his hearing problem without outside urging and after careful consideration and after all the problems involved were fully explained to him.

He was subsequently fitted with a wearable hearing aid to which he adjusted well. In the beginning he had some problems of tolerance for loud noises but he overcame these quickly and adjusted like a duck taking to water. This octogenarian is a typical example of that type of the older person who can be rehabilitated. He operates an active and busy general

merchandise business in Wilmington, and is still working in his store nine hours a day. You so often hear stated that when a person reaches this age you can not teach an old dog new tricks or he is not interested in hearing what people have to say. We have found this is not necessarily true and that many cases indicate a complete program of rehabilitation. You also may have heard it stated that those with nerve type deafness can not be helped by amplification. This we have not found to be true and I should say in the years I worked with service personnel and veterans I have come in contact with 6-7000 adults and that in only about five or six cases did we find it impossible to provide some worthwhile benefit with amplification.

We have been in operation approximately nine months. Patient volume is growing slowly but steadily and has recently shown a considerable increase. In the nine month period we have treated 240 patients for a total of 786 patient visits. Indication of the recent increase in patient load is the fact that in the month of October we had 190 patient visits, which is about 25% of all visits to-date. We have excellent programs established with many of the state agencies. A full and complete program has been established with the State Board of Health under which program we furnish complete diagnostic and rehabilitative services to pre-school and school age children from all over the state. We have similar arrangements with the State Board of Vocational Education for furnishing similar services to the hard of hearing adults under their auspices. Referrals are being made to us from public and private school systems, private educators, other hospitals, such as Johns Hopkins, otologists, pediatricians, obstetricians, neurologists, psychologists, general practitioners, and private individuals. Patients are coming in regularly from not only the Wilmington area but the lower end of Delaware, southern Pennsylvania, and southern New Jersey, some patients making a 200 mile round trip twice weekly for therapy. One request for services has even been made from as far away as Akron, Ohio.

Our existence is gradually becoming known and we are trying in every way to fill the need

for audiologic services which we know exists in this area.

#### REFERENCES

1. Davis Hallowell: *Hearing and Deafness*, 1947, p. 3, New York: Murray Hill.
2. Hardy, W. G.: Pauls, "Fundamentals in the Treatment of Communicative Disorders Caused by Hearing Disability," Part II, "Journal of Speech and Hearing Disorders," 13: 97-105, 1948.

### THE ROLE OF THE SPEECH THERAPIST IN THE GENERAL HOSPITAL

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To many of us speech is as casual a function as breathing or walking. We never think very much about it. Communication seems to require no greater skill than merely thinking aloud and listening to the thoughts of the other person. Actually, however, there is probably no human behavior so intricately coordinated as speech and, unfortunately, there exists a great number of factors ranging from environmental to neurological which alone, or in combination, can cause speech and language to be defective. It is small wonder then that there is estimated to be in this country alone, a group of persons numbering over six times the total number of blind, deaf, crippled, and mentally defective combined. This group consists of those who suffer from speech defects.

We say a person has a speech defect when it deviates so far from the speech of other people in the group that it calls attention to itself, interferes with communication, or causes its possessor to be maladjusted to his environment.

The treatment of this vast number of speech disorders is being carried out for the most part today in our public school speech correction programs and in university speech and hearing centers. There are many areas, however, that do not have the advantage of a university center. In this area, for example, although the University of Delaware has a speech department, its main emphasis is on the speech sciences and not on speech correction and speech pathology. The Speech Center at the Delaware Hospital is the only one of its kind serving this area for the purpose of diagnosing and treating disorders of speech and hearing.

One great advantage of a speech center

within a general hospital is that it makes more readily available certain medical information that the speech pathologist or correctionist must have in order to carry out an efficient and effective speech correction program. Rare, indeed, is the speech problem where we do not feel the necessity of consulting certain medical specialists to help us obtain an accurate and complete picture of the case before us. From the simple articulation case to the complex case of aphasia it is important to acquire all information possible so that we can rule out certain factors as contributing to the problem, and so we can more clearly define certain goals as concerns prognosis and methods of treatment. Recognizing that, at any given moment, one is a product of his inheritance and of all his past experiences, we are interested not only in the various aspects of each case's present condition, but also his various records, including his medical and surgical, dental, nutritional, otological, neurological, developmental, psychological, and educational histories. Thus a speech center within a general hospital has a better opportunity to obtain much of this important information. But this does not complete the picture.

There are many instances where there should be a definite working relationship, a team if you please, composed of certain medical specialists and the speech therapist. One example of this is the case of the cleft palate child. Such a case not only requires the expert services of the oral surgeon, the orthodontist, and prosthodontist but there is a definite place on this team for the speech therapist. It is his aim, in this case, through the use of certain techniques and methods, to strengthen the repaired oral structures, especially the palate, and to teach the patient to use them effectively and to the greatest advantage so that nasality is reduced to a minimum and socially acceptable speech is acquired. It requires the close cooperation and team work of all these specialists to provide for the cleft palate child the best opportunities for a normal existence.

The combined services of the orthopedic surgeon, the occupational therapist, the physio-therapist, and the speech therapist working together to rehabilitate the cerebral palsied child is another splendid example of the "team" program.

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Then there is the case of the aphasic, who is characterized by inability to comprehend, formulate, or express certain ideas through speech. Before attempting to rehabilitate this person speech-wise, we want a full neurological report, and in many instances a complete psychological work-up. Again, only by securing all the information possible and working in close cooperation with all those concerned can we hope to achieve a fruitful and successful speech retraining program.

The delayed speech case whose speech and language function is below the norms of other children of his age, is brought to a speech center by his parents for help with his problem. How foolish it would be to institute corrective speech procedures without first consulting the pediatrician, the otologist, audiologist and the psychologist; the nasality case without first obtaining otorhinolaryngological information to determine if there are any pathological factors which may be causing the distorted, hypernasal speech, and so on down the list of the many types of speech and language defects. For any speech therapist there is a constant need for consulting and seeking the advice of medical authorities who have a common interest in the case. How much easier it is to carry out this consulting and cooperative program when the various specialists are centralized as in a general hospital. How difficult and time consuming it is sometimes for the university center or public school correctionist to secure this information. It may delay beginning treatment weeks or months, and early treatment is sometimes just as important a factor in the field of speech correction as it is in the medical field.

So far, I've attempted to point out some of the advantages that a speech therapist feels and recognizes as being included as part of the services offered by the general hospital. The opportunity of having close hand information and medical specialists with whom we can work and to whom we can refer patients with speech difficulties, helps us, as speech correctionists, to become aware of all aspects of the case so we will know more definitely the rate and amount of progress we can hope to attain when helping the person to overcome his speech problem.

But it is equally as important to consider, for a moment, the many areas in which the Speech Center could be of service to different types of cases that are seen by medical specialists in the hospital—cases that could benefit from speech or voice therapy. For example, a patient is troubled with persistent hoarseness and he is seen by the laryngologist. Laryngologic examination reveals nothing which is of etiological or pathological significance. The diagnosis is that the hoarseness is due to chronic misuse of the voice. In such a case the person should also be seen by a speech therapist whose aim would be to explain how he is abusing his voice, and to teach and train this particular patient how to use his voice correctly and how to phonate at an optimum pitch level so that irritation of the vocal folds is reduced and the hoarseness condition alleviated.

Or an example of another voice condition—hysterical aphonia—which is due to a hysterical symptom formation and is characterized by loss of voice for purpose of speech with no accompanying laryngeal pathology. The Speech Center is also prepared and equipped to treat cases such as this. It has been found that cases, such as the one just described, often require only a few sessions of voice therapy and counseling before their voice returns to normal. It is important, of course, to have the assistance of the psychiatrist and psychologist to prevent manifestation of the hysterical symptom from appearing or transferring to some other bodily function.

Still another example is the person with cancer of the larynx who must undergo a laryngectomy. If this person, prior to the operation, could be brought to the attention of the speech therapist and have it explained that such an operation does not necessarily mean that he'll have to go without speech, that it's possible to acquire a "new voice," that esophageal speech, as the new voice is called, is being used successfully by hundreds of people who have had the same operation and that he, too, with proper training can learn to communicate as effectively as before — then how much better that individual's personal outlook will be when he learns he'll be able to carry on, for the most part, just the same as before.

Sometimes, we even begin basic instruction and teaching esophageal speech before surgery, and usually within a few weeks, sometimes even within a few days after the operation, speech training is resumed.

These are only a few of the instances and ways a speech therapist functions in the general hospital. The examples were cited to illustrate the need and advantages of a working relationship between the medical staff and the speech pathologist, and to point out the types and kind of services the Audiology and Speech Center of the Delaware Hospital has to offer.

Since the inception of this Center we have seen and worked with the following types of speech and language disorders: articulatory defects, delayed speech, cleft palate, stuttering, nasality, aphasia, a laryngectomy case, and of course speech defects associated with and resulting from hearing impairment. In addition to actual speech therapy, our present program includes parent education and guidance, with suggestions to the parents as to how they might carry out a supportive speech training or retraining program in the home, and mental hygiene to impress upon the parents, or the patient, whichever the case may be, the importance of accepting the problem and of setting goals which are actualistic and realistic so that speech therapy may progress and prognosis is not guarded by too many psychological and emotional factors.

To date, our speech therapy program has been quite successful. This is due in large part to the physical location of our Center, the fine equipment we have, and the splendid cooperation we've had from local agencies and physicians. We hope that eventually, as the Center and its services become better known to the public and to the medical men in this area, that we'll be recognized as a Center of major significance in the field of speech and hearing therapy. Only through continued cooperation and working together with the specialists in the allied medical fields, can we hope to make our services more valuable to the hospital and to the community.

## CORTICAL STEROIDS AND CLINICAL MEDICINE\*

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The physician who is to use ACTH or cortisone wisely must remember that he is (a) using potent hormones that (b) specifically cure no disease. Aside from rare instances of replacement therapy (as in Addison's disease, Waterhouse-Friderichsen syndrome, and panhypopituitarism) doses of these hormones currently employed are sufficiently high to be viewed as certainly unphysiologic and probably pharmacologic in action. By using ACTH or cortisone the physician usually produces a temporary and artificial hormone imbalance in the body of his patient in an effort to modify (suppress) the course of disease. This is well illustrated in the treatment of so-called collagen diseases, no one of which is due to adrenocortical failure, i.e., a lack of normal cortical hormone supply.

In the interest of best care of the patient we need to keep abreast of the state of knowledge of the function of the endocrine glands in health and disease with particular reference to the pituitary-adrenal axis. Sayers<sup>1</sup> recently has reviewed knowledge of the function of the adrenal cortex.

Of 28 crystalline steroids which have been isolated from adrenal tissue a half dozen have some known biological activity.<sup>2</sup> Only minute amounts of these steroids are stored in the adrenal cortex. The exact nature and number of such chemical materials elaborated by the adrenal gland is unknown. They undergo rapid changes in the tissues of the body, the nature of which change is likewise unknown.

Clues to adrenocortical activity are found in alterations in the cortex (gross, histological and chemical changes), in alterations in the organisms (lymphocytopenia, fall in circulating eosinophil count, alteration in carbohydrate and protein metabolism, changes in water and electrolyte metabolism), and varying rates of excretion of steroids in the urine. Urinary corticoids are classified as biocorticoids (steroids with biological activity) and chemocorticoids (having the chemical nature

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of steroids without regard to activity). Study of one of the oldest colorimetric tests for an excretory form of steroid hormones, i.e., the "urinary 17-ketosteroids", has led to the following conclusion: under normal conditions adrenocortical function is responsible for the total 17-ketosteroid excretion in the adult female and for two-thirds of the urinary 17-ketosteroids in the male. The testes contribute the remaining one-third in the male. There is reason to believe that 17-ketosteroids and possibly even androgens may arise from adrenal cortical hormones by degradation in the liver and other tissues.

The secretion of an adrenocorticotrophic hormone (ACTH) by the pituitary gland is an essential link in the series of events, initiated by stress, which activate the adrenal cortex. In man with normal adrenal glands ACTH administration brings about all the metabolic changes which have been ascribed to the adrenal cortex. Chief regulatory mechanisms affecting the rate of discharge of ACTH appear to be:

a) Peripheral-humoral: the titer of cortical hormone or hormones in the body fluids regulates the rate of discharge of ACTH.

b) Central neural and central neurohumoral: a nervous reflex mechanism allows speedy response of the pituitary to acute need by the body.

c) Sympatho-adrenal system: epinephrine has a stimulating effect on the production of ACTH. A wide variety of stresses acting on the sympathetic nervous system results in the discharge of ACTH. (See Fig. 1).

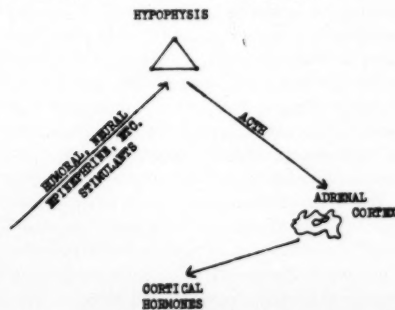


FIG. 1

Estimates on the rate of secretion of cortical hormone (under optimal and stressful

conditions) by various methods and investigators indicate that, in terms of cortisone, between 0.1 and 20 mg. of hormone per kilogram of body weight may be produced daily in the rat, dog and man.<sup>1</sup> In view of the many metabolic activities influenced by the adrenal cortex it is tempting to classify known steroids in three categories, based on chemical structure and known effects. This oversimplification may be justified by its aid to the clinician who finds himself lost in the maze of reported findings in adrenal chemistry and physiology.

1) 11-oxysteroids (affecting carbohydrate and protein metabolism, causing sodiumphoresis, lymphocytopenia and eosinopenia) "Glucocorticoids". Example: cortisone.

2) 11-desoxysteroids (causing sodium retention and other DCA-like effects on electrolytes) "Mineralo-corticoids". Example: desoxycorticosterone acetate.

3) Ketosteroids (with androgenic and protein anabolic action). Example: adrenosterone.

A review of the broad scope of metabolic effects of pituitary tropin and cortisone has been made by Sprague<sup>2</sup> and need not be summarized here.

Whether cortisone is given the patient or his adrenal is stimulated to produce excess cortical hormone by ACTH, the effects are comparable in the immediate pharmacologic effects seen in the patient. In the first instance there may be suppression of the patient's adrenocortical function, clinical evidence of which can be demonstrated after discontinuing cortisone. Also there is possibly reduction in some functional activity of the pituitary while cortisone is given. These phenomena are not highly significant during and after short periods of hormone medication, so far as we know at present.<sup>4</sup>

The cortisone and ACTH effects in collagen diseases mark a new era in clinical medicine. Studies on the mechanism of action have yet to explain just what happens in tissue cells when excess cortisone is present. Three theories of action which have received attention are: "1) interference with the release or the toxic action of the anaphylactogenic substance of the antigen-antibody reaction; 2) altera-

tions in cell permeability through action on hyaluronidase; and 3) suppression of mesenchymal tissue, in particular inhibition of the development of granulation tissue."<sup>1</sup>

The chief effect of cortisone and ACTH seem to lie in the capacity to inhibit the reactivity of mesenchymal tissues, to block reactions of allergy and hypersensitivity<sup>3</sup> and to suppress inflammation resulting from bacterial infection or chemical irritants.<sup>5</sup>

The principal diseases treated with ACTH and cortisone during the past three years may be grouped as follows:

- I. Replacement Therapy  
Adrenal Cortical Failure (Addison's Disease, Congenital Adrenal Hypoplasia, Waterhouse-Friderichsen syndrome following Adrenalectomy for Hypertension, and in panhypopituitarism)
- II. Collagen Diseases  
Rheumatic Fever  
Rheumatoid Arthritis  
Lupus Erythematosus  
Scleroderma
- III. Allergies  
Asthma  
Urticaria  
Drug Sensitization  
Loeffler's Syndrome  
Periarteritis Nodosa  
Serum Sickness
- IV. Ocular Lesions  
Choroiditis  
Uveitis  
Sympathetic Ophthalmia  
Kerato-Conjunctivitis of various types  
Miscellaneous inflammatory and developmental defects
- V. Skin  
Inflammations and allergies such as Pemphigus, Exfoliative Dermatitis, Burns and Scleredema
- VI. Intestine  
Ulcerative Colitis, Regional Enteritis
- VII. Kidney  
Nephrosis and Nephrotic Syndrome
- VIII. Pulmonary Granulomatosis, e.g. Berylliosis
- IX. Gout
- X. Lymphatic Tumors: acquired Idiopathic Hemolytic Anemias

Undesirable effects from the clinical use of the hormones are chiefly these:—

1. Cushing's Syndrome: hypertension, edema, moon face, amenorrhea, mental depression (plus skin changes below).
2. Skin: hyperpigmentation, acne, hypertrichosis, increased skin oiliness, striae atrophicæ, delayed wound healing.
3. Central Nervous System: both manic and depressive states. Usual effect is that of euphoria; psychosis or convulsion occasionally.
4. Antipyretic Effect: may conceal presence of infection and disturb immunologic responses.
5. Electrolytes: early sodium and water retention; later hyponatremia, hypokalemic alkalosis.
6. Blood sugar elevation and glycosuria. Increased urinary nitrogen. "Diabetogenic" effect and negative nitrogen balance only in large doses.
7. G. I. System: (a) increases pepsinogen (pepsin and uropepsin); (b) may cause bleeding or perforation of peptic ulcer.
8. Adverse effect on tuberculosis and other infections.
9. Induces failure in poorly compensated heart disease.
10. Relapses in malaria, more frequent head colds and other virus infections.
11. Hemolytic crises in sickle-cell anemia.

A review of the clinical records of 89 patients treated with cortisone or ACTH in the Delaware Hospital during 1950 and 1951 shows that undesired effects were minimal. Detectable water retention during the first three or four days of treatment were observed in 21 patients. Rounding of the contour of the face ("moon face") was noted in 7 patients, temporary increase in blood pressure (10 millimeters mercury rise in diastolic reading) occurred in 9, and euphoria in 5 patients.

Two patients responded with an unfavorable mental state, 2 with increased "nervousness", and 2 developed myocardial infarction while under treatment. The small number of unfavorable mental states noted in this series of patients may have been, at least in part, the result of an adequate potassium intake.<sup>6</sup> While the appearance of acute myocardial in-

farection may have been fortuitous in the two patients so affected, the event emphasizes the need for pause when considering hormone therapy in the presence of hypertensive or arteriosclerotic heart disease. Only one patient developed a significant hypokalemia during treatment.

Of the 49 patients receiving cortisone, 37 (75.5 per cent) had the hormone for a period of twelve days or less. Of the 40 patients receiving ACTH, 28 (70 per cent) had that medication continuously for twelve days or less. Short term therapy was found to be less likely to produce undesired effects than was long term therapy. Some of the unwanted manifestations (actually not "side effects") of cortisone therapy, e.g. increased blood pressure, were controlled in part by giving the patient a low sodium diet and adding potassium. Quantitative eosinophil counts gave variable results and were of little help in following the course of the patients since many patients had low counts at the beginning of treatment.

Ninety per cent of the patients in the Delaware Hospital group had disease which clearly justified the use of one of the hormones on the basis of previous experience. The immediate results of therapy were favorable to a varying degree in 40 patients (45 per cent). No benefit was seen in 29 patients (32.5 per cent) and the records contained no comment as to the response of 20 patients (22.5 per cent). The inability of the hormones to cure disease is emphasized in the fact that 11 patients (27.5 per cent of the group showing temporary benefit) had a return of symptoms before they left the hospital or soon thereafter (shown in a follow-up or a later admission note). Since the follow-up for this group after discharge from the hospital is quite incomplete, one cannot say how many other patients in the benefited group had a recrudescence of their disease in subsequent weeks or months. Inflammatory eye disease, asthma and dermatitis medicamentosa had high incidences of favorable response to the hormones. In the series there were 16 patients diagnosed as having rheumatoid arthritis. Only 11 of these had a satisfactory immediate response.

In conclusion, it appears that these potent

hormones can be used safely for short periods with a minimal number of undesired effects. Using large doses or prolonging their use calls for careful observation of the patient and laboratory study of electrolyte and nitrogen metabolism. All of the tissues of the body probably are affected to some extent when the currently popular "pharmacologic" doses of cortisone or pituitary tropin are employed. Only rarely does one find a need for replacement adrenal or pituitary hormone therapy. The ability to modify the course of disease in allergy, hypersensitivity, acute ocular and cardiac inflammation, and disorders of collagen is a superb aid to the physician provided he keeps clearly in mind the limitations of the hormones, the true nature of the patient and the known facts of his disease. Cortical hormones actually cure no presently known disease.

#### REFERENCES

1. Sayers, George: The Adrenal Cortex and Homeostasis, *Physiol. Rev.*, 38: 241-320, July, 1950.
2. Jacobson, R. P., and Pincus, G.: The Chemistry of Adrenal Steroids, *Amer. J. Med.*, 10: 531-538, May, 1951.
3. Sprague, R. G.: Cortisone and ACTH: A Review of Certain Physiologic Effects and Their Clinical Implications, *Amer. J. Med.*, 10: 567-594, May, 1951.
4. O'Donnell, William; Fajano, S. S.; and Weinbaum, J. G.: Human Adrenal Cortex after Administration of ACTH and Cortisone, *Arch. Int. Med.*, 88: 28-35, July, 1951.
5. Woods, A. C., and Wood, R. M.: The Action of ACTH and Cortisone on Experimental Ocular Inflammation, *Proceedings of Second Clinical ACTH Conference*, Vol. I, p. 453-459, Philadelphia: Blakiston Company, 1951.
6. Ransohoff, William; Brust, Albert A.; Reiser, Morton F.; Mirsky, I. Arthur; and Ferris, Eugene B.: The Effect of Sodium and Potassium on the Metabolic and Physiologic Responses to ACTH, *Proceedings of Second Clinical ACTH Conference*, Vol. I, pp. 160-176, Philadelphia: Blakiston Company, 1951.

### INTRA-ARTERIAL HISTAMINE IN PERIPHERAL VASCULAR DISEASE\*

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The purpose of this paper is to present a new simplified technique for the use of intra-arterial histamine in treating occlusive vascular diseases of the lower extremities. The problem of peripheral vascular disease, due to arteriosclerosis, is becoming increasingly important because of the advancing age of the general population.

A number of substances have been recommended in the past two decades as a means

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of improving the peripheral arterial circulation. These have been listed by Linton<sup>1</sup> and include the intravenous injection of a hypertonic solution of sodium chloride; a non-specific foreign protein (typhoid vaccine); ether; the intramuscular injection of sodium tetrathionate; the oral administration of cytochrome C or vitamin E; and the subcutaneous injection of histidine combined with the oral administration of vitamin C. Beneficial effects of these methods have generally been transitory.

More recently attempts at chemical sympathectomy have been utilized with some success. Dibenzamine (dibenzylbeta-chloroethylaminohydrochloride), which blocks the terminations of the sympathetic motor pathways in smooth muscle, tetraethylammonium chloride and hexamethonium bromide, which are ganglionic blocking agents, all produce a peripheral vasodilation. However, unpleasant side effects have limited the usefulness of these drugs. Priscoline (2 benzyl 4,5 imidazoline hydrochloride), an adrenergic blocking agent, is probably the most widely employed medical means of treating peripheral vascular diseases at this time.

In 1948 Mufson et al.<sup>2</sup> demonstrated by radiosodium diffusion studies that the intra-arterial injection of histamine into the femoral artery resulted in a pronounced increase in the flow of blood to the lower extremity in certain peripheral vascular diseases. His purpose in administering histamine was to reopen the completely or partially closed blood vessels and the reestablishment of an adequate circulation. This, it was found, could often be accomplished by the primary fixation of histamine in the blood vessel walls of the affected extremity with little or no dissipation into the general circulation when the histamine was administered slowly. The histamine was then destroyed by the histaminase present in the tissues.

In an effort to produce a prolonged histamine effect Mufson<sup>3</sup> devised a drop-by-drop method of infusing histamine solution into the femoral artery. This consisted of diluting in 500 c.c. of normal saline 1.38 to 2.75 mg. of histamine acid phosphate (equivalent to 0.5

to 1.0 mg. of histamine base), and infusing this solution into the femoral artery under positive pressure by a manometer. (See Figure 1).

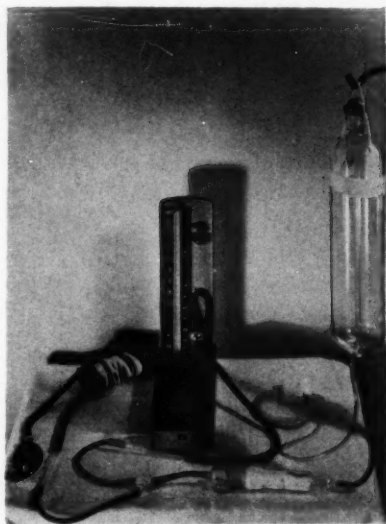


FIG. 1

Histamine, a decarboxylation product of the amino acid histidine, is rapidly destroyed when administered parenterally. Symptoms produced by too rapid administration of histamine are a metallic taste, a rapid drop in blood pressure, vasodilation of the skin vessels, intense headache, visual disturbances, bronchial constriction, dyspnea, and in several cases, shock.

Because of the time and nursing care involved when histamine is administered by the Mufson technique, a simple method was devised by one of us (J.F.F.) whereby a histamine solution may be injected into the femoral artery in approximately fifteen minutes.

This method employs an ordinary 50 c.c. syringe to which has been attached a two-way stopcock to facilitate the attachment of a piece of rubber tubing approximately one-eighth inch in diameter and twelve inches long. A glass adapter is attached to the other end of the rubber tube and to the adapter is attached



a 2-inch, 22 gauge, short bevel needle. (See Figure 2).

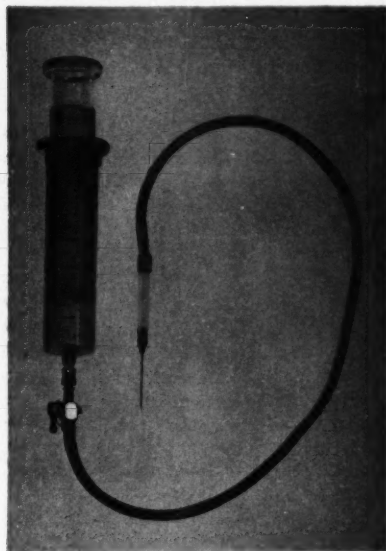


FIG. 2

Varying amounts of histamine may be injected into the femoral artery with this apparatus. Generally, as in initial dose, 0.25 to 1.0 mg. of histamine base in 50 c.c. of physiologic saline is injected in 15 minutes and the amount of histamine used subsequently depends upon the patient's response to the initial injection. In most of the cases treated in this report the interval between injections was 48 hours.

The skin over the femoral artery to be injected is sterilized and then infiltrated with 1% procaine solution. The femoral pulsation is located and the artery is fixed between the index and middle fingers to minimize mobility of the vessel, and the needle is directed perpendicular to the artery. A pulsating thrust of bright red blood into the glass adapter indicates entry into the artery. An immediate or delayed erythema usually results from histamine infusion.

Before histamine is administered to a patient one should especially inquire as to a past history of peptic ulcer, bronchial asthma, cor-

onary artery disease, and histamine cephalgia. While receiving histamine the patient should be supine. In the event an excess amount of histamine solution escapes into the general circulation a vasodilatation will result with a drop in blood pressure and syncope may ensue if the patient's head is elevated. This has not been experienced with the patient flat in bed. Side effects during the use of histamine have been found to be directly proportional to the rate of injection. Almost no unpleasant reactions have been experienced when the histamine solution has been injected over a fifteen minute period. Epinephrine, a specific histamine antagonist, should be available when histamine is administered. In the experience of the authors, in over 350 histamine infusions, the use of epinephrine has not been necessary. Wold<sup>4</sup> cites one case of thrombophlebitis resulting from trauma to the vein in the course of an arterial injection.

Thirty-five patients with peripheral vascular disease have been treated by the method described above during the past eighteen months. There were 19 male and 16 female patients in the present study, whose ages ranged from 49 to 77 years. The duration of disease varied from twelve hours in the case of a popliteal arterial embolus to twenty years in a leg ulcer due to arteriosclerosis obliterans. The number of intra-arterial histamine injections varied from 1 to 40, the latter being the greatest number of injections administered to a single patient.

Of the 35 cases treated, arteriosclerosis obliterans was present in 18 cases, 9 patients presented stasis ulcers due to venous disease, 3 had experienced arterial embolism of the popliteal artery, and 1 was treated for immersion foot. Three patients were treated with lesions in which, it was believed, peripheral vascular disease may have been a contributing factor, although a definitive diagnosis could not be made. There were 14 cases of diabetes mellitus among the cases treated.

Although there are no controls in the present series, most of the patients treated may justifiably serve as their own controls because of their failure to respond to other accepted therapeutic measures. No effort was made to select cases in this study.

Case reports of five of the patients treated

are presented. The results were satisfactory in each case. They were selected because, it is believed, the value of intra-arterial histamine is clearly demonstrated in each of the five patients reported.

**Case 1.** P. S., a 58-year-old male, complained of pain in the right thigh and buttock, precipitated by walking one-half block. The duration of this complaint was three years. X-rays revealed marked calcification of the vessels of the thigh and pelvis. The diagnosis was arteriosclerosis obliterans. Treatment with Priscoline for six weeks increased walking tolerance to five blocks. Immediately after one injection of histamine into the right femoral artery the patient could walk fourteen blocks without experiencing intermittent claudication. When seen six months after the initial injection, walking tolerance had not diminished.

**Case 2.** G. W., a 73-year-old male diabetic, was admitted to the clinic with complaints of rest cramps and intermittent claudication of the right leg of one year's duration, precipitated by walking one and one-half blocks. The diagnosis was diabetes mellitus and arteriosclerosis obliterans. Priscoline partially alleviated the rest cramps but did not improve claudication. Two intra-arterial injections of histamine were given with complete relief from rest cramps, and the patient was able to walk more than ten blocks without claudication. Over a period of one year one additional histamine injection has been administered to maintain this improvement.

**Case 3.** J. B., a 62-year-old male diabetic was admitted to the hospital in August, 1949, with a draining sinus, of four month's duration, on the fourth toe of the right foot. The diabetes was well controlled and conservative treatment with antibiotics and Priscoline failed to improve the condition of the toe. The patient was then given three intra-arterial injections of histamine at forty-eight hour intervals. Following the second injection the sinus ceased draining, and twenty-four hours after the third injection the crust was removed from the site of the sinus. The toe had completely healed and the patient was discharged after twenty days of hospitalization.

As an outpatient, five intra-arterial injections of histamine were administered at inter-

vals of two weeks and Priscoline was continued by mouth. The patient had no further difficulty six months after the last histamine therapy.

**Case 4.** A. M., a 69-year-old diabetic female, was admitted to the hospital with lymphangitis of the right foot and a draining sinus of the third toe, of one month's duration. Conservative therapy and control of the diabetic state failed to result in improvement after one month of hospitalization. A second X-ray of the foot revealed osteomyelitis of the involved toe and marked calcification of the vessels of the foot. The toe was disarticulated. The surgeon noted that no bleeding occurred at the operative site and stated that possibly a more extensive surgical procedure may be necessary.

Histamine therapy was begun two days after the disarticulation, with the patient receiving three injections of histamine in the right femoral artery. On the eighth post-operative day the wound was completely healed.

The patient returned to the hospital six months after discharge, when following trauma, she developed cellulitis of the right foot and early gangrene of the fourth toe. X-rays showed the presence of osteomyelitis involving the proximal phalanx of the fourth toe. In an effort to aid post-operative healing, eight injections of histamine were administered prior to disarticulation of the involved toe. Osteomyelitis of the fourth metatarsal developed and metatarsalectomy was performed, followed by intensive histamine therapy. Histamine was administered daily for ten days and then every fourth day for three additional injections. Two months after the last operative procedure the patient was discharged from the hospital with complete healing of the operative site.

**Case 5.** D. M. was a 60-year-old white male who had had a left mid thigh amputation. After learning to use a prosthetic device he developed rest cramps and claudication in the right leg precipitated by walking one block. The diagnosis was arteriosclerosis obliterans. Priscoline could not be taken because of undesirable side effects. One intra-arterial histamine injection completely relieved the rest cramps and increased the walking tolerance to six blocks. The patient has

not attempted to walk a greater distance. No rest cramps or claudication have been experienced three months after the initial injection.

#### DISCUSSION

Of the 35 cases treated with intra-arterial histamine the best results have been evident in treating rest cramps and claudication, in which 10 of the 13 cases experienced moderate to complete relief. Seven patients with arteriosclerosis obliterans who had rest cramps and claudication as the only symptoms of their disease required one to two injections to render them asymptomatic for a period of four to twelve months.

Of the 9 stasis ulcers treated, 3 healed promptly and have remained well for periods up to fifteen months. Another healed completely but recurred after three months and has not been under our care since that time. In two cases the results were equivocal and three ulcers were not benefited.

In 6 ulcers of the toes due to arteriosclerosis obliterans, 4 were completely healed and have either remained healed for a period up to fourteen months or have developed mild recurrences which responded promptly to further therapy. The results were equivocal in 2 others.

Three arterial emboli of the popliteal artery were treated and were complete therapeutic failures. Improvement resulted in one case of immersion foot but could not be attributed entirely to histamine. The 3 patients for whom a definite diagnosis was not made are classified as therapeutic failures.

The authors believe that the method described offers a safe, simple adjunct in the treatment of peripheral vascular disease. During the course of 350 intra-arterial injections, the majority in patients over 60 years of age, no serious side effects have been observed. An attempt was made to avoid unpleasant systemic responses by slow administration. However, the fact that each treatment usually extends over a period of only fifteen minutes indicates that this method may be used as an office procedure with facility. Femoral arterial puncture is a relatively simple procedure, is well-tolerated by the patient, and no complications have arisen therefrom in our experience.

#### SUMMARY

1. A new simplified technique for the administration of intra-arterial histamine is described.

2. Three hundred and fifty injections have been accomplished without serious side effects. It is recognized that histamine is a potent vasodilator but unpleasant side effects may be avoided by judicious use.

3. The authors believe that this method represents a useful adjunct in the treatment of certain peripheral vascular diseases. Our conclusions are based primarily upon clinical evaluation rather than experimental studies.

4. The intra-arterial route in the treatment of peripheral vascular disease should be further investigated, utilizing control studies.

5. From experience in the use of intra-arterial histamine, the authors believe that smaller doses of histamine base may be just as efficacious as doses up to 1.0 mg. and would recommend that 0.25 mg. of histamine base be used for the initial injection. Further dosage may be gauged by the response to the initial treatment.

6. The present method of administering histamine precludes the danger of arterial air embolus.

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#### BIBLIOGRAPHY

1. Linton, R. R.: Medical Progress Peripheral Vascular Disease. *New Eng. J. Med.*, 240: 645, 1949.
2. Mufson, L., Quimby, E. H., and Smith, B. C.: Use of Radiosodium as a Guide to the Efficacy of Drugs Used in the Treatment of Diseases of the Peripheral Vascular System, *Am. J. Med.* 4: 73, 1948.
3. Mufson, L.: A New Treatment for the Relief of Obstructive Diseases of Peripheral Arteries, *Ann. Int. Med.*, 29: 903, 1948.
4. Wold, L. E.: Traumatic Thrombophlebitis During Intra-arterial Histamine Therapy, *Ann. Int. Med.*, 32: 967, 1950.

#### CLINICAL VALUE OF VENOUS PRESSURE MEASUREMENTS

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The measurement of venous pressure is useful clinically as an aid in diagnosis. Interest in the past has centered chiefly on its usage in instances of heart disease particularly in confirming the presence and following the progress of heart failure (2, 3, 4, 5). Results of venous measurements, in turn, have brought about reevaluation and debate concerning the

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mechanisms of heart failure. With increased investigations there have been refinements in technique, as well as an appreciation that the determination of venous pressure is of value in the diagnosis and study of numerous conditions. Various aspects of venous pressure, the methods of determination, and the clinical significance of changes in venous pressure will be discussed.

#### NORMAL PHYSIOLOGY OF VENOUS FLOW AND VENOUS PRESSURE

An understanding of the normal mechanisms contributing to existing pressure in the veins is essential before discussing the possible value of venous pressure measurements. The initial force to the flow of blood in the systemic veins is imparted by the contractions and propulsive action of the heart and arteries (6, 9). Pressure in the veins, therefore, represents in a large part the energy imparted to the flow of blood by the ejection from the left ventricle into the aorta, this energy being progressively dissipated in overcoming the frictional resistance of the vascular channels.

The venous pressure is also varied depending on the amount of blood delivered from the arterioles. If the arterioles are widened, this pressure is increased. This is modified to a large extent by the ability of the small venules to dilate and adjust themselves to the amount of inflowing blood, and thus, little variation in pressure may occur (6, 8, 9). The reverse also occurs and upon constriction of the arterioles, the capillaries and venules through the same humoral and nervous mechanisms that alter arteriolar tone, reduce their capacity and hereby maintain pressure (6, 8, 9). At the other end of the circulation, venous pressure also tends to be stabilized because of the capacity of the heart to alter cardiac output in relation to wide variations in venous return.

Another important propulsive force is afforded the systemic venous flow by the tone and intermittent contraction of the skeletal muscles (3, 5, 9). The venous valves are so arranged that such pressure exerted on the veins produces a blood flow only in the direction of the heart.

A major influence affecting venous pressure and venous return is the intrathoracic pressure (3, 5, 7, 9). In inspiration, the pressure

inside the thorax is actually less than atmospheric pressure by approximately 6 mm. of mercury, and during expiration, may amount to as much as minus 2.5 mm. of mercury. If the positive pressure in the vein is added to the negative pressure in the thorax, the total pressure directed forward toward the heart will be obtained. This is called the "effective" venous pressure (3). Therefore, inspiration decreases venous pressure since it increases "effective" pressure, whereas expiration decreases "effective" pressure and causes a rise in systemic venous pressure.

The gravitational effects on the venous circulation are very great since they act as a hydrostatic influence on the venous pressure. The right atrium is generally accepted as that point at which gravity has no influence on the venous pressure (3, 5, 8). At any point above this, gravity aids the veins. At any point below this level, however, the venous pressure recorded represents in part the weight of the column of blood interposed between that point and the right atrium. The effect of gravity is normally counterbalanced by nervous vascular control, intramuscular pressure, muscle contraction, intra-abdominal tension, and the system of venous valves (8).

#### THE MEASUREMENT OF VENOUS PRESSURE

Despite the numerous variables affecting pressure some of them, at least, must counterbalance each other in an effective manner since venous pressure tends to be surprisingly constant in normal subjects. The technique of measurement tends to eliminate other variables. To avoid alterations due to exercise the patient is made to rest in bed 15 to 30 minutes prior to the test (3). The test is performed in the supine position with the arm at an angle of 45 degrees with the body and in such a position that the antecubital vein to be used is at, or just below, the level of the right atrium. Attention to this position of the arm eliminates collapse of the vein from elevation and avoids any tendency to compression or torsion of the axillary or subclavian vein from too much abduction or adduction of the arm (3). Alterations due to muscle tension are diminished by having the patient relax as fully as possible. The effects of intrathoracic pressure are to be avoided by having the patient breathe easily and regularly. Sighing,

coughing, straining, temporary apnea, and talking prevent accurate evaluation of the venous pressure (2).

The supine position minimizes the effect of gravity. The hydrostatic factor should be entirely eliminated by the use of a level for reference of the venous pressure measurement at which the hydrostatic pressure is zero. Many different zero levels have been used, so that various normal pressure values are reported (2, 3, 4, 5, 7, 8, 10, 11). These disagreements are unnecessary since the selection of the zero level has made no practical difference. Except that the results have to be evaluated individually and are not interchangeable, they are none the less valid for each technique. The zero reference recommended by Lyons, Kennedy, and Burwell (3) at a point 10 Cm. from the skin of the back in the supine position has much to favor it and is the basis for the pressure values mentioned in this discussion. This level closely approximates the level of the right atrium and the values correspond closely with those obtained in a careful study of the problem of eliminating the hydrostatic factor (12).

For all practical purposes, measurement of venous pressure is limited to the peripheral systemic branches. Determinations of pressure in the pulmonary and portal circuits do not fall in the realm of every day, practical usage. The caval system, however, is readily available and three general techniques of measurement have been employed: clinical inspection, the indirect method, and the direct method.

#### METHOD OF CLINICAL INSPECTION

Suitable superficial veins are selected for inspection, but this technique is useful only when the pressure is greater than normal, so that the veins are abnormally distended (7, 8). Of the superficial veins, the external jugulars are widely employed for inspection. In a normal patient in a semi-sitting position these veins are not filled above the plane of the manubrium (13). Abnormally high pressure, at least in the superior vena caval system is indicated if distension occurs above this level. Together with an enlarged liver, with or without peripheral edema, this finding usually represents a generalized increase in venous pressure, such as in congestive failure.

As early as 1904 Gaertner suggested that when an extremity is elevated its veins represent a manometric column in communication with the right atrium (7, 14). With the patient relaxed and sitting quietly the arm is slowly raised and the superficial hand veins are inspected for collapse. The distance from the point of collapse to the fourth interspace (taken as the plane of the right atrium) is a rough measurement of venous pressure and is normally equivalent to 100 mm. of water.

The veins on the undersurface of the tongue can also be employed in estimating venous pressure (15). Normally, these veins are found to be collapsed with the subject in a sitting position, but are obviously distended with pressure above 200 mm. of water.

Superficial vein inspection is to be taken only as a rough guide. When the findings are positive it is fairly safe to conclude that the venous pressure is elevated. However, it is not safe to say that the pressure is within normal limits when the findings are negative since many patients with heart failure may have a high venous pressure when supine and normal venous pressure when sitting (2, 5). Inspection, also, is of no value in the presence of sclerotic vessels since these do not readily distend or collapse.

Inspection is a more reliable diagnostic aid in the detection of localized venous obstruction (7, 8). The pattern and distribution contrast greatly with the normal areas. Care must be taken, of course, to recognize the anatomic variations and the differences in visibility of veins in normal individuals. The veins should be distended and not merely visible. Likewise it should be remembered that distension of superficial veins more frequently is a reflection of obstruction in deeper veins.

#### THE INDIRECT METHOD

This method depends on the principle that the measurement of the pressure necessary to collapse a vein, when exerted on that vein wall, is equal to the intraluminal pressure and should represent the venous pressure (16). A transparent capsule is sealed over a superficial vein and air is introduced until the point of collapse, at which point the pressure is read from a connecting water manometer. The method is inaccurate because of difficulties in employing the apparatus, the errors intro-



duced in the presence of sclerotic or deep vessels or vessels with hypertonus of the wall, and is of no value clinically.

#### THE DIRECT METHOD

The direct method is the technique most popularly employed when greater accuracy is needed than that afforded by clinical inspection. A great number of instruments have been devised for this purpose (3, 5, 10, 17). The principle of the method is to measure the venous pressure directly by inserting a needle into a vein which is suitably connected to a water manometer. Readings are made from the manometer, most systems employing saline, and are expressed as mm. of saline. The position of the patient and other details in preparation have already been described. Any accessible vein can be employed for direct measurement. The antecubital vein is usually selected in the arm. The best vein for comparison in the lower extremity is the femoral vein (18).

#### NORMAL VALUES IN DIRECT DETERMINATION OF VENOUS PRESSURE

Various values have been reported as normal (3). The lack of uniformity in the selection of the zero level for reference of the measurements is mostly responsible for the variations and has already been discussed. When using a zero level 10 Cm. from the skin of the back in a supine position, the range of normal is found to be 50 to 150 mm. of saline (3). Femoral vein pressure in a normal individual is about equal to or slightly higher than the pressure of the antecubital vein of the same individual (4, 18). There appears to be little difference between venous pressures in children and in adults (19).

With exercise, venous pressure rises from 20 to 50 mm. of saline in a normal subject, and returns to or slightly below the initial level within 30 seconds after stopping the exercise (20). In congestive failure, it rises to higher levels upon exercising and gradually reaches the initial level more slowly (20). This appears to occur even when the resting venous pressure of a cardiac patient is normal. When there is local obstruction to venous flow, exercise of that part causes a progressive rise in pressure of the local veins and the return to the resting level is also slow.

Intrathoracic changes alter the venous pres-

sure in the normal individual (3) and have already been pointed out, in general. Quiet inspiration causes a decrease in pressure of about 5 mm. of saline, greater drops occurring with the Muller experiment (resisted inspiratory effort from the expiratory position of the chest 3, 7). Expiration increases the venous pressure by about the same amount, 5 mm. of saline, and a greater increase occurs with the Valsalva experiment (resisted expiratory effort from the inspiratory position of the chest 3, 7). An unusually deep or sighing respiration may cause a drop of 5 to 40 mm. of saline.

Infusion of 500 to 1500 cc. of normal saline or 5% glucose solution causes an increase in venous pressure only if more than 20 cc. per minute is administered (7).

In normal individuals, pressure in the right upper quadrant of the abdomen for 1 minute produces no change in venous pressure or a slight fall (2, 5, 21). This is explained by considering that the reduction of blood delivered from the inferior vena cava brings about better emptying of the superior vena cava. In patients with congestive heart failure, such pressure on the abdomen produces a rise in venous pressure of 10 mm. or more, even though the resting pressure may have been normal (1, 2, 5, 21). In this case, it is believed that the increase in arm-vein pressure results from the fact that abdominal compression quickly increases the return of blood from the viscera through the inferior vena cava, especially from the liver. This increased load competes with the blood delivered from the superior vena cava. The increased venous return is not adequately handled by the failing heart and the stagnation in the superior vena cava is reflected by the increase in pressure in its tributaries (1, 2, 5, 21). This observation has been termed the "hepato-jugular reflux" phenomenon. When the superior vena cava is obstructed, pressure in the abdomen also causes an increased arm-vein pressure, but the mechanism is different. In this instance, compression of the abdomen impedes the flow of blood to the inferior vena cava, which in this syndrome is the main route for ingress of blood from the superior vena caval system.

#### CLINICAL SIGNIFICANCE OF CHANGES IN VENOUS PRESSURE

The normally functioning venous system



may be affected by many conditions that can cause either local or generalized alterations. The alterations may consist of an elevation or a depression of the normal venous pressure. The aid of venous pressure measurements is employed in obtaining more accurately the deviations from the normal. With the fundamental understanding of the mechanisms governing venous flow and venous pressure, the recognition of the underlying condition causing an alteration becomes logically established. The various possibilities will now be discussed.

#### **A. Local Increases in Venous Pressure.**

Many disorders, acting by interference with venous blood flow, produce localized increases in venous pressure with no alteration of such pressure in the non-affected areas. The effects produced depend upon the anatomical distribution of the involved vein. Obstruction of the inferior vena cava, for example, produces a distinct increase in pressure above normal in the leg veins in contrast with normal pressure in the arm veins. The impediment to blood flow can result readily from tympanites, abdominal compression with a binder, pregnancy, ascites, thrombosis, ligation, tumors pressing or invading the vessel, enlargement of the right lobe of the liver due to a congenital cyst, an echinococcus cyst or a solitary abscess, or to a right subphrenic abscess (8). Bilateral thrombosis, or other obstruction of the femoral or iliac veins, will give the same findings of that of inferior vena caval obstruction: elevated pressure of the leg veins with normal venous pressure elsewhere in the body.

A very dramatic example of local increase in venous pressure is seen in the superior vena caval syndrome. The principal causes of obstruction of the superior vena cava without obstruction of the inferior vena cava, are aneurysms of the aortic arch, bronchogenic carcinoma and mediastinal lymphoma; less frequently being produced by metastatic carcinoma of the mediastinal lymph nodes, primary thrombosis, and mediastinitis (27). This obstruction results in a significantly higher venous pressure in the antecubital veins, plus a demonstrable, temporary, added increase upon exercise of the extremity with a slow, gradual return of the pressure to a resting level. Femoral venous pressure remains nor-

mal if there is no impairment of the inferior vena cava (27, 28). Twenty of thirty-five cases of superior vena caval syndrome studied showed antecubital venous pressures equivalent to 300 mm. of normal saline or more (27). Higher pressures result if obstruction occurs below the level of entrance of the azygos vein, since in such a case the azygos cannot serve as part of the collateral circulation (8). Pressure upon the right upper quadrant causes an added increase in venous pressure as already described.

Apart from the above situations, which result in a bilateral reflection of the obstruction, any condition that impedes the venous flow from an extremity will produce a rise in venous pressure above normal in that extremity with no alteration in the systemic venous pressure. Normally, venous pressures taken simultaneously in both arms will not differ by more than 10 mm. of saline (28). With obstruction of the venous return in one arm, the difference in venous pressure ranges from 20 to 30 mm. to 300 mm. or more of saline (28). The main local causes of obstruction of the axillary and subclavian veins are malignant neoplasm (usually intrathoracic), thrombosis secondary to heart failure, and thrombosis secondary to trauma or effort of the arm and shoulder (8). Obstruction of one innominate vein without obstruction of the other may result from the same causes producing the superior vena caval syndrome. Unilateral conditions involving the pleural cavity, such as thoracoplasty, hydrothorax and pneumothorax, can increase the venous pressure in the corresponding extremity due to the increase in the intrathoracic pressure (11).

Obstruction of one femoral or one iliac vein will produce increased venous pressure in that leg, though it may not be evident until the extremity is exercised, with normal pressures recorded in the other extremities (29). Obstruction to a lower portion of the jugular venous system can produce an increase in venous pressure in that area only with normal pressures elsewhere. In cases of arterio-venous fistulas in any region, the pressure in the vein near the fistula is increased, but the systemic venous pressure is normal in the absence of cardiac failure (30).

#### **B. Generalized Increases In Venous**

**Pressure.** Venous pressure measurements have been most extensively used in congestive failure, with abundant evidence of their value in this condition (3, 4, 5, 11, 32). In right ventricular failure alone, and in combined cardiac failure, an elevation of pressure in the systemic veins occurs above the upper limit of normal of 150 mm. of saline, with common measured levels of 200 mm., 300 mm., and more. The added increases occurring with exercise and with pressure on the abdomen have already been mentioned. Left ventricular failure, in itself, does not increase the pressure in the caval system (1, 2). In many instances of improvement under treatment of right ventricular failure, the decrease in edema and hepatomegaly may lag behind the return of the venous pressure to a normal level, and confusion may result if earlier measurements were not taken (2, 5). Cases of mild heart failure may present persistently normal venous pressures at rest (5). In these instances, compression of the abdomen shows an increase in venous pressure to 10 mm. or more. Even though the physical signs of right ventricular failure may not be striking, the venous pressure may be quite high if it is measured during rapidly progressing failure (8). Exercise, also, causes marked elevation above normal. It must be extremely rare to find cases of persisting right ventricular failure in which the determination of venous pressure, including abdominal compression, is entirely normal (8).

Chronic constrictive pericarditis characteristically produces marked dilatation of veins and striking increase in systemic venous pressure. The elevation is persistent and high, from above 150 mm. to 400 mm. or more. The pressures may fluctuate but do not return to normal, and the pressures in the arms and legs are not notably different, except in the presence of considerable ascites (23).

Acute compression of the heart, caused by pus, sterile exudate or blood, because of its sudden onset and shorter duration causes less marked dilatation of the superficial veins and a peripheral venous pressure reaching about 200 mm. of saline (8). In both acute and chronic cardiac compression, the high peripheral venous pressure results from mechanical interference with the diastolic dilatation

and filling of the heart and not from heart failure per se.

Increase in venous pressure, reaching a level of 200 mm. or more in severe cases, is a constant circulatory finding in obstructive emphysema (1, 24). This results not from heart failure but from the striking increase in intrathoracic pressure that results from the disease. Right sided heart failure, however, may ensue and be superimposed on the basic pulmonary disease.

Systemic venous engorgement without pulmonary congestion is considered by some to be a distinct entity called Bernheim's syndrome (8). The belief is that the effects are brought about not by right ventricular failure due to myocardial weakness, but from obstruction to blood flow through the right ventricle because of displacement of the interventricular septum, owing to marked left ventricular hypertrophy and dilatation from such conditions as hypertension, aortic valvular disease and mitral valvular disease (25). The diagnosis is suggested when a patient with left ventricular hypertrophy shows signs of right ventricular failure, with minimal or absent signs of pulmonary congestion. The circulation time may remain within normal limits for considerable time, whereas the venous pressure is appreciably elevated (25).

Elevated pressure in the antecubital and saphenous veins has been observed in patients with varicose veins when they assume a recumbent position (26). It has been postulated that this results from an increase in blood volume that enables the patient to compensate for the effects of gravity when standing, but results in an overcompensated state when supine.

**C. Decreases In Venous Pressure.** Localized decrease in venous pressure may occur with thrombosis of a lateral sinus, reflected by a low or absent pressure in the corresponding internal jugular vein (8). Generalized decrease in venous pressure occurs in shock (peripheral circulatory failure) (6, 7). Systemic venous pressure depression may be found to be as low as 10-20 mm. of saline. It has been shown that in cases of shock there is a lowering of intramuscular and venous pressure before the values for plasma volume

and arterial blood are altered (31). Venous pressure determinations, however, are not required for the diagnosis of shock; in fact, the diminished pressure and collapsed state of the veins frequently make it difficult to insert a needle for venipuncture for any purpose.

Slight temporary depressions in venous pressure levels may occur normally in a number of procedures: abdominal compression in the normal subject, the Muller experiment, and hyperventilation. These are of no clinical significance, being minor and temporary, and it is important that they be not misunderstood (3, 4, 5, 10, 11).

#### SUMMARY

1. Venous pressure measurements are an aid in the diagnosis and study of alterations in normal venous physiology. Though principally employed in the past in relation to congestive heart failure, they are of value in numerous other conditions.

2. The technique of venous pressure measurement is discussed and normal values are presented.

3. The clinical significance of deviations of venous pressure from the normal is briefly reviewed, with emphasis on local and general alterations.

#### REFERENCES

- Oppenheimer, B. S., and Hitzig, W. M.: *Am. Heart J.*, 12: 257, 1936.
- Hussey, H. H., Wallace, J. J., and Sullivan, J. C.: *Am. Heart J.* 23: 22, 1942.
- Lyons, R. H., Kennedy, J. A., and Burwell, C. S.: *Am. Heart J.* 16: 675, 1938.
- Griffith, G. C., Chamberlain, C. T., and Kitchell, J. R.: *Am. J. Med. Sci.*, 187: 642, 1934.
- Winsor, T., and Burch, G. E.: *Am. Heart J.* 31: 387, 1946.
- Sodeman, W. A.: *Pathologic Physiology*. Philadelphia: W. B. Saunders Co.
- Friedberg, C. K.: *Diseases of the Heart*. Philadelphia: W. B. Saunders Co.
- Hussey, H. H., and Jeghers, H.: *New Eng. J. Med.*, 237: 776, 1947.
- Best, C. H., and Taylor, N. B.: *Baltimore: Williams and Wilkins Co.*
- Taylor, F. A., Thomas, A. B., and Schleiter, H. G.: *Proc. Soc. Exper. Biol. and Med.*, 27: 867, 1930.
- Evans, W.: *New Eng. J. Med.*, 207: 934, 1932.
- Holt, J. P.: *Am. J. Physiol.*, 130: 635, 1940.
- Lewis, T.: *Brit. M. J.*, 1: 849, 1930.
- Robertson, H. F.: *JAMA*, 101: 206, 1933.
- May, A. M.: *Am. Heart J.*, 26: 685, 1943.
- Krogh, A., Turner, A. H., and Landis, E. M.: *J. Clin. Invest.*, 11: 357, 1932.
- Griffith, G. C., Chamberlain, C. T., and Kitchell, J. R.: *Am. J. Med. Sci.*, 187: 371, 1934.
- Ferris, E. B. Jr., and Wilkins, R. W.: *Am. Heart J.*, 13: 431, 1937.
- Jacques, L. H.: *J. Iowa State M. Soc.*, 32: 294, 1942.
- Szekely, P.: *Am. Heart J.*, 22: 360, 1941.
- Hitzig, W. M.: *J. Mt. Sinai Hosp.*, 12: 309, 1945.
- Burch, G. E., and Winsor, T.: *Proc. Soc. Exper. Biol. and Med.*, 53: 135, 1943.
- Burwell, C. S., and Blalock, A.: *JAMA*, 110: 265, 1938.
- Kountz, W. B., and Alexander, H. L.: *Medicine*, 13: 251, 1934.
- Russek, H. I., and Zohman, B. L.: *Am. Heart J.*, 30: 427, 1945.
- Mayeron, H. S., Long, C. H., and Giles, E. J.: *Surgery*, 14: 519, 1943.
- Hussey, H. H., Katz, S., and Yater, W. M.: *Am. Heart J.*, 31: 1, 1946.
- Hussey, H. H.: *Am. Heart J.*, 17: 57, 1939.
- Tyson, M. D., and Goodlett, W. C.: *Surgery* 18: 669, 1945.
- Elkin, D. C., and Warren, J. V.: *JAMA*, 134: 1524, 1907.
- Henstell, H. H., and Gunther, L.: *Am. J. Med. Sci.*, 209: 187, 1945.
- Warren, J. V., and Stead, E. A. Jr.: *Arch. Int. Med.*, 73: 128, 1944.

#### CLINICOPATHOLOGIC CASE RECORD

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#### PRESENTATION OF CASE\*\*\*

DR. LEVITSKY: This 53-year-old, Negro male farmer was admitted to the Medical Service on September 28, 1950. He had been well until approximately three months before admission, when he began to notice periumbilical pain which radiated to the left costo-vertebral angle. The pain was precipitated by eating and would stop when he stopped eating. The pain gradually persisted until it became constant and it was most severe in the left costo-vertebral angle. It was worse when he was lying down and it was considered, by the patient, to be more severe than a dull ache. He obtained relief only by a "needle". There had been anorexia and he had a twenty pound weight loss over the past three months. Only one episode of vomiting had occurred, and this was productive of a white and green vomitus. There had been no nausea, tarry stools, blood in stools, change in bowel habit, chills or fever, burning on urination, or hematuria. Systemic review revealed nocturia twice nightly, and occasional headaches. The remainder of the systemic review was negative.

Past medical history: In September, 1950 the patient had an admission to a rural hospital where he was told he had "gall bladder disease". The patient stated that he had an occasional head cold when working in hay. No history of tuberculosis, kidney disease, venereal disease, or heart disease was obtained.

Family history: His mother died at the age of 86 years, of heart disease. His father died of unknown causes when the patient was six years old. No history of tuberculosis or diabetes was obtained.

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Physical examination: The patient was a well developed, asthenic, colored male, in no acute distress. Blood pressure was 130/90; temperature, 98.8°; pulse, 88; and respirations, 24. Examination of head and neck revealed greying hair, deviation of nasal septum to the left. Sclerae were not jaundiced, conjunctivae were of good color and pupils were equal and reacted to light and accommodation. Dental caries were present. Fundoscopic examination revealed normal fundi. The chest expansion was equal. There were no abnormalities to auscultation and percussion. The point of maximal impulse was in the fifth intercostal space in the midclavicular line. There was normal sinus rhythm and no murmurs were heard. On examination of the abdomen there was muscle guarding and tenderness in the epigastrium and periumbilical region. There was also slight tenderness and muscle guarding in the left flank. The liver and spleen were not palpable. There were no other masses palpable. The genitalia were normal. Rectal examination disclosed skin tags and normal prostate gland. No rectal masses were palpated. Only a few shotty inguinal nodes were present. Neurological and skeletal examinations were within normal limits.

Laboratory data: In addition to blood and urine studies given below, the BUN was 20 mg.%, serum amylase 180 mg.%, Mazzini negative.

Hospital course: On admission it was necessary to order demerol every four hours to control the patient's pain. An x-ray of the chest, abdomen and IV pyelogram showed no abnormalities. G.I. series and barium enema were within normal limits. During the hospital stay three benzidine and guaiac tests on feces were negative. Gastric analysis on the 6th day revealed no free acid and 20 units of total acid on fasting contents. Maximum values after test meal were 40 units of free acid and 84 units of total acid. No histamine was given. Urine culture showed a chloromycetin and aureomycin sensitive non-hemolytic staphylococcus albus and an enterococcus. On the 14th hospital day the fasting blood sugar was 190 mg.% and an ECG disclosed ST segment depressions in the limb leads. On the 21st hospital day, a lumbar puncture revealed clear, colorless fluid with less than one

white cell per cubic millimeter. Initial pressure was 120 mm. Queckenstedt disclosed normal hydrodynamics. On the 22nd day the spinal fluid was cloudy, contained 386 white blood cells per cubic millimeter, 38 mg.% of protein, sugar 108 mg.%, chloride 660 mg.% and a negative Wassermann and colloidal gold curve. X-ray examination of the dorsal and lumbar spines showed slight lipping of the lateral borders of the lower lumbar vertebrae, otherwise the examination was normal. On the 23rd day the icterus index was 9 units, prothrombin time 86%, cephalin cholesterol and thymol turbidity were negative. Bromosulphalein was 5% retained after 45 minutes, acid phosphatase was 1.32 units, serum protein was 7.94 gm. with 4.02 gm. of albumin and 3.93 gm. of globulin. Urine was negative for bile. On the 24th day the patient was placed in a tub of hot water in order to induce muscle relaxation for an abdominal examination. Findings were muscle guarding in the epigastrium, and no masses were palpable.

The patient during his hospital stay, up to the 24th day, had lost 9 pounds. His temperature remained normal and pain had not been relieved after trials on post-Sippy diet with tr. belladonna, phenobarbital and gelusil; etamon; banthine; placebo.

The only relief obtained had been from demerol. On the 28th day a glucose tolerance test was performed.

		Urine
Fasting sugar	159 mg.%	2+
½ hour sugar	305 mg.%	2+
1 hour sugar	246 mg.%	2+
2 hour sugar	216 mg.%	1+

On the 30th day an operation was performed. Post-operatively the patient continued to have pain and was discharged November 6, 1950.

He was readmitted on January 17, 1951. He became progressively weaker and quietly expired on February 1, 1951.

#### Laboratory Studies

	9/28/50	10/20/50	10/30/50
RBC: 3.8	4.5	4.0	
Hgb: 12.9 gm.-82%	13.7 gm.-88%	12.5 gm.-80%	
WBC: 5,900	7,200	4,800	
Polys seg: 65%	60%	59%	
Non seg: 0%	2%	0%	
Lymph: 28%	34%	33%	
Mono: 5%	3%	4%	
Eosin: 1%	1%	4%	
Baso: 1%			

	Urine	
9/28/50	10/11/50	10/26/50
Color: yellow-clear	amber	clear-amber
Sp. gr: 1.024	1.028	1.011
Reaction: acid	acid	acid
Albumin: Negative	Negative	negative
Sugar: Negative	1+	negative
Acetone: Negative	Negative	negative
RBS: —	—	—
WBC: 3-4	1-2	0-1
Casts: —	—	—

## DIFFERENTIAL DIAGNOSIS

DR. MERRILL: The history as presented gives no definite evidence of infection being the primary cause of the patient's illness, although there are findings suggestive of secondary urinary-tract infection and findings suggestive of transient infection as reflected in the spinal fluid later in the patient's initial hospitalization.

A few of the more likely remaining diagnoses might include conditions such as gastric carcinoma, peptic ulcer, gall bladder disease, retroperitoneal tumor, and some form of pancreatic disease such as chronic pancreatitis or cancer of the pancreas.

Because of the insidious and progressive nature of the disease as described, one must necessarily accept a strong likelihood of some form of neoplastic condition eventually resulting in the demise of the patient. Along with this thesis are certain outstanding negative and positive findings such as marked weight loss and anorexia without frank gastro-intestinal symptoms, and the observation that the patient had definite symptoms and signs of a condition revealing few individual incapacitating findings referable to any specific symptom complex. The ubiquitous and extremely variable nature of cancer leads us to the latter conclusion. But let us examine a few of the possibilities already mentioned.

The possibility of "gall bladder disease" in the patient's history is noted. However, lack of colicky pain, specific food idiosyncrasy, nausea and vomiting, jaundice, alcoholic stools, or other frequent accompanying features of the condition are a strong indication that such does not exist in this patient as a primary condition. And should acute perforation occur, perhaps with an associated pancreatitis, marked prostration, with an acute abdomen, leukocytosis, fever, etc. are usually present — too severe a condition to fit well

into this patient's course of illness. Chronic perforation usually presents several of these symptoms but in a milder degree.

In considering peptic ulcer or gastric carcinoma, one must remember that there is a small percentage of such cases not detected by X-ray analysis (probably 5% of all ulcers and gastric carcinoma). As we well know, pain is the outstanding symptom of ulcer. It is almost invariably epigastric and may radiate through to the back and around the costal border. Presence of pain in the back suggests chronic perforation. However, the rhythm of the pain in this patient is certainly more suggestive of gastric carcinoma. But again, as in the case of gall bladder disease, there is absence of a true symptom complex including lack of evidence for bleeding in the gastro-intestinal tract, at least occasional episodes of nausea and vomiting and definite evidence for hypo- or hyperacidity. Absence of occult blood suggests that the lesion is benign and although marked weight loss may occur in both conditions, true loss of appetite is more likely to occur in malignancy.

In general, the chronicity of peptic ulcer characterized by remissions and exacerbations with typical rhythmic pains is not the picture presented in this patient's history. On the other hand, the duration of the patient's symptoms, the course of his disease and the presence of certain important symptoms such as anorexia, weight loss, type of pain and the age of the patient are compatible with gastric carcinoma and it therefore, must be kept in mind in the final differential diagnosis. This should include possible metastatic lesions to the pancreas.

Retroperitoneal tumor is, unfortunately, a condition frequently neglected as a diagnostic possibility in such cases as these. Its possibility is suggested to me primarily because of lack of overt symptoms referable to any one organ system in this patient's history. However, there was no evidence shown for such abnormality on X-ray of the abdomen, pyelograms or GI series. One such case I have recently seen certainly would indicate that marked severity and variability of symptoms, frequently referable to the renal, intestinal and skeletal systems may be present without any specific indicative findings on physical



examination or by routine laboratory studies. However, I do not suspect the condition in the patient, primarily in view of the pain precipitated by eating (initially), laboratory findings probably referable to the pancreas, no palpable masses and other negative findings.

In discussing disease of the pancreas, one should include acute and chronic pancreatitis and carcinoma of the pancreas. Acute pancreatitis is considered here because it may initially be insidious in onset and occasionally lead to the chronic form of the disease—compatible with the duration of the history as given.

Chronic pancreatitis may be conveniently divided into the intralobular and interacinal types but the primary change in both types is an increase in fibrous connective tissue. This, in turn, can be considered the result of a previous inflammatory condition or a degenerative process in the pancreas itself. Destruction of the parenchyma or occlusion of the ducts determine, to a large extent, the degree of dysfunction present. As in the case presented, there may be a history of gall bladder disease. Also the pain, as in this case, may be severe, constant or intermittent, in the epigastrium radiating around the costal margin or through to the back. Chronic weight loss, frequent tenderness over the pancreatic area and occasionally a diabetic condition of varying severity may be present.

A flat plate of the abdomen in this case, did not reveal pancreatic calculi. The one and only serum amylase computed was within normal limits and it was unfortunate that other calculations had not been done for comparison. The outstanding laboratory findings compatible with some form of pancreatic disease in this patient were his diabetic-like glucose tolerance curve (without family history of the condition) and a high fasting blood sugar. Chronic pancreatitis tends to involve the pancreas in toto, or, if we are to consider the severity of the condition in this patient, one would expect to find typical foul smelling, bulky, clay colored stools. Furthermore, chronic pancreatitis does not tend to disturb the endocrine function as frequently or as severely as its exocrine function.

Carcinoma is the most common of all tumors of the pancreas and as it usually involves

the head of the pancreas it must be differentiated from carcinoma of the common duct and obstruction at its distal ostia. Such lesions usually give rise to acholic stools, nausea and vomiting, colicky pain, jaundice and frank liver damage. None of the foregoing can be said to be actually present as related in this patient's history. However 5% of carcinoma of the pancreas occurs in the body, etc. 2-3% may be confined to the tail, and 40-50% may be diffused or at least not confined to any one of the three major segments. Metastases, particularly to the liver and local lymph nodes, are frequent. Cancer of the pancreas also tends to occur in the middle and old age groups and is much more frequent in males. Pain is the most common and severe symptom in carcinoma of the pancreas, particularly when it involves the body. Its quality and location are certainly compatible with that described in the patient and considered here. Although one might expect steadily increasing jaundice, GI symptomatology, and possibly obstruction of the biliary tract, such is not absolutely necessary in diagnosing carcinoma of the pancreas nor was it clear as to the presence of these or other common symptoms or signs of the condition toward the latter part of his initial, and during his entire second hospitalization.

In my mind, the case presented must be diagnosed by viewing it in a general fashion only. Some of the essential findings are obviously withheld or unknown. I definitely feel that this patient had a primary disease of the pancreas. In view of the insidious progressive nature of this man's disease, correlated with anorexia, weight loss, and evidence of pancreatic damage, I believe that this man's primary condition was carcinoma of the pancreas, probably primarily or initially in the body segment. My second choice would be primary chronic pancreatitis. The third choice is the much less likely possibility of gastric carcinoma with metastasis to the pancreas.

#### CLINICAL DIAGNOSIS

1. Carcinoma of the pancreas
2. Chronic pancreatitis
3. Gastric carcinoma with metastasis

#### PATHOLOGICAL DISCUSSION

DR. HUNTINGTON: Biopsy obtained at laparotomy on the 30th day showed an adenocarcinoma



enoma which was thought to be of bile duct origin; however, the exact differentiation between this entity and a duct carcinoma of the pancreas is not possible microscopically.

At autopsy an adenocarcinoma of the pancreas was found which appeared to originate in the head of the pancreas. This invaded the serosal surfaces of the duodenum, stomach, and transverse colon. The malignant process had also involved the esophageal hiatus of the diaphragm and diffuse metastases studded the peritoneum. The liver contained numerous metastatic nodules measuring from 0.5 to 3.0 cm. in diameter, and the lungs were also diffusely studded with small nodular metastases. Microscopically the malignancy proved to be a duct adenocarcinoma of the pancreas.

#### PATHOLOGICAL DIAGNOSIS

1. *Primary carcinoma of the pancreas*
2. *Carcinomatosis*

#### MEDICAL SOCIETY of DELAWARE Amendments Adopted BY-LAWS

The following Amendments for the booklet of By-Laws of the Medical Society of Delaware were adopted by the House of Delegates on October 8, 1951. Each member should make these notations in his copy of the By-Laws.

##### ITEM I

Page 10, Line 6 and Line 16, Article 3, Section 6 — Dues and Assessments. Change "April 1" to "April 30".

##### ITEM II

Page 18, Line 19, Section 9 — Transfers. Change "one year" to "six months". Section 10 Bottom Line—Transfer Cards. Change "Twelve months" to "six months".

##### ITEM III

Page 10, New Amendment to Article 3, Section 6 — Dues and Assessments. Active members of this Society shall be excused from payment of annual dues and special assessments of this Society as long as they are on active duty with the Armed Forces of the United States. Said members shall pay the dues for the year in which they are inducted into service, but shall not pay the dues for the year in which they are mustered out.

#### BOOK REVIEWS

*Physical Medicine and Rehabilitation for the Clinician.* Edited by Frank H. Krusen, M. D. Cloth. Pp. 371. Price, \$6.50. Philadelphia: W. B. Saunders Company, 1951.

Twenty-four prominent authors, seventeen of whom are on the Mayo Clinic Staff, have contributed sections for this valuable volume on this new specialty of Physical Medicine and Rehabilitation. All the phases of this specialty are described as they would be applied by the average clinician in the care of his patients.

Treatment of any specific disease is not discussed in detail since the object of this book is to present the latest developments in physical medicine and rehabilitation. However, the various methods of electro-diagnosis are given in detail.

The Fundamentals of Anatomy, Therapeutic Exercise and Physiology as Related to Physical Medicine and Rehabilitation will be found very informative to physicians and medical students who are interested in getting a clear understanding of kinesiology and the application of corrective measures.

This book will be of particular value to the specialist in this field, the physiatrist, as well as the orthopedist who sees many of the patients with bone and joint diseases and deformities.

*The Specialties in General Practice.* Edited by Russell L. Cecil, M. D., with articles by fourteen contributors. Pp. 818. Cloth. Price, \$14.50. Philadelphia: W. B. Saunders Company, 1951.

This is indeed an encyclopedia of medicine for the use of the general practitioner. All of the specialties are covered in so far as the condition involved is within the ability and experience of the family physician. Postoperative care is also discussed when patients with major surgery are returned to the referring physician for after care.

There are fourteen chapters on diagnoses and treatments which are discussed in detail. The last and perhaps the most useful chapter for the family physician is the one on Psychiatry. The treatment of the mind is given in understandable language. Psychosomatic medicine, psychoanalysis, as well as the neuroses and psychoses, are effectively presented.

This book will be found very useful by every general practitioner and more so by those who are located in areas where convenient consultation with the specialist is not possible.

# 1789 — MEDICAL SOCIETY OF DELAWARE — 1952

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## DELAWARE STATE MEDICAL JOURNAL

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VOL. 24 JANUARY, 1952 No. 1

### A. M. A. DUES FOR 1952

1. American Medical Association membership dues for 1952 are \$25.00.
2. Fellowship dues for 1952 have been abolished.
3. American Medical Association membership dues are levied on "active" members of the Association. A member of a constituent association who holds the degree of Doctor of Medicine or Bachelor of Medicine and is entitled to exercise the rights of active membership in his constituent association, including the right to vote and hold office as determined by his constituent association, and has paid his American Medical Association dues, subject to the provisions of the By-Laws, is an "active" member of the Association.
4. American Medical Association member-

ship dues are payable through the component county medical society or the constituent state or territorial medical association, depending on the method adopted locally.

5. Commissioned medical officers of the United States Army, the United States Navy, the United States Air Force or the United States Public Health Service, who have been nominated by the Surgeon General of the respective services, and the permanent medical officers of the Veterans Administration and the Indian Service, who have been nominated by their Chief Medical Directors, may become Service Fellows on approval of the Judicial Council. Service Fellows need not be members of the component county or constituent state or territorial associations or the American Medical Association. They do not receive any publication of the American Medical Association except by personal subscription. If a local medical society regulation permits, a Service Fellow may elect to become an active member of a component and constituent association and the American Medical Association in which case he would pay the same membership dues as any other active member and receive a subscription to The Journal of the American Medical Association.

6. An active member of the American Medical Association may be excused from the payment of American Medical Association membership dues when it is deemed advisable by the Board of Trustees, provided that he is partially or wholly excused from the payment of dues by his component society and constituent association.

The following may be excused in accordance with this provision: (a) members for whom the payment of dues would constitute a financial hardship as determined by their local medical societies; (b) members in actual training but not more than five years after graduation from medical school; (c) members who have retired from active practice; (d) members who have reached the age of 70, on

request, and starting January 1 following the 70th birthday, and (e) members who are called to active duty with the armed forces (exemption begins July 1 or January 1 following entrance on active duty). The last two categories are excused from A.M.A. dues regardless of local dues exemptions.

7. Active members of the American Medical Association are not excused from the payment of American Medical Association membership dues by virtue of their classification by their local societies as "honorary" members or because they are excused from the payment of local and state dues. Active members may be excused from the payment of American Medical Association membership dues only under the provision described in Paragraph 6 above.

8. American Medical Association membership dues include subscription to The Journal of the American Medical Association. Active members of the Association who are excused from the payment of dues will not receive the Journal except by personal subscription at the regular subscription rate of \$15.00 a year.

9. Members may substitute one of the special journals published by the Association for The Journal to which they are entitled as members.

10. A member of the American Medical Association who joins the Association on or after July 1 will pay membership dues for that year of \$12.50 instead of the full \$25.00 membership dues.

11. An active member is delinquent if his dues are not paid by June 1 of the year for which dues are prescribed and shall forfeit his active membership in the American Medical Association if he fails to pay the delinquent dues within thirty days after the notice of his delinquency has been mailed by the Secretary of the American Medical Association to his last known address.

12. Members of the American Medical Association who have been dropped from the Membership Roll for nonpayment of annual dues cannot be reinstated until such indebtedness has been discharged.

13. The apportionment of delegates from each constituent association shall be one delegate for each thousand (1,000), or fraction

thereof, active members of the American Medical Association as recorded in the office of the Secretary of the American Medical Association on December 1 of each year.

In view of items 6d and 6e above, the following members, after approval of the AMA, will no longer pay AMA dues. Those marked (H) will also no longer pay State or County dues:

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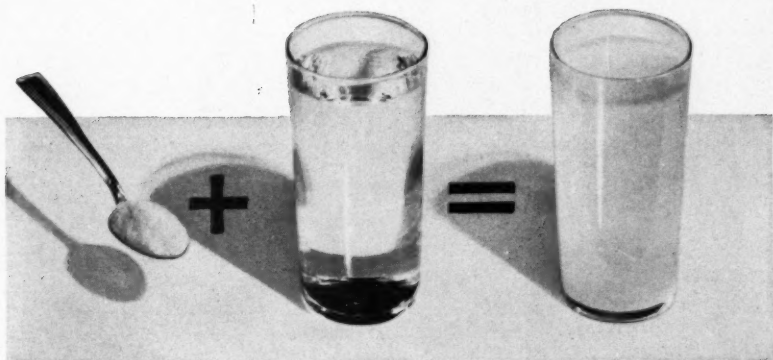
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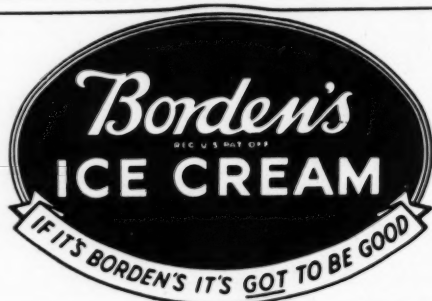
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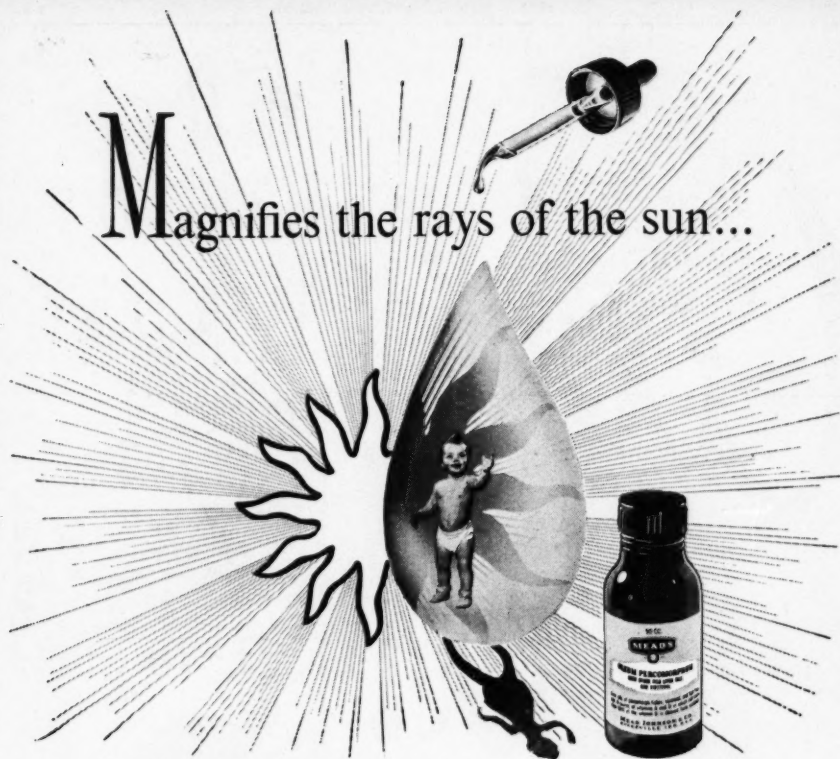


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